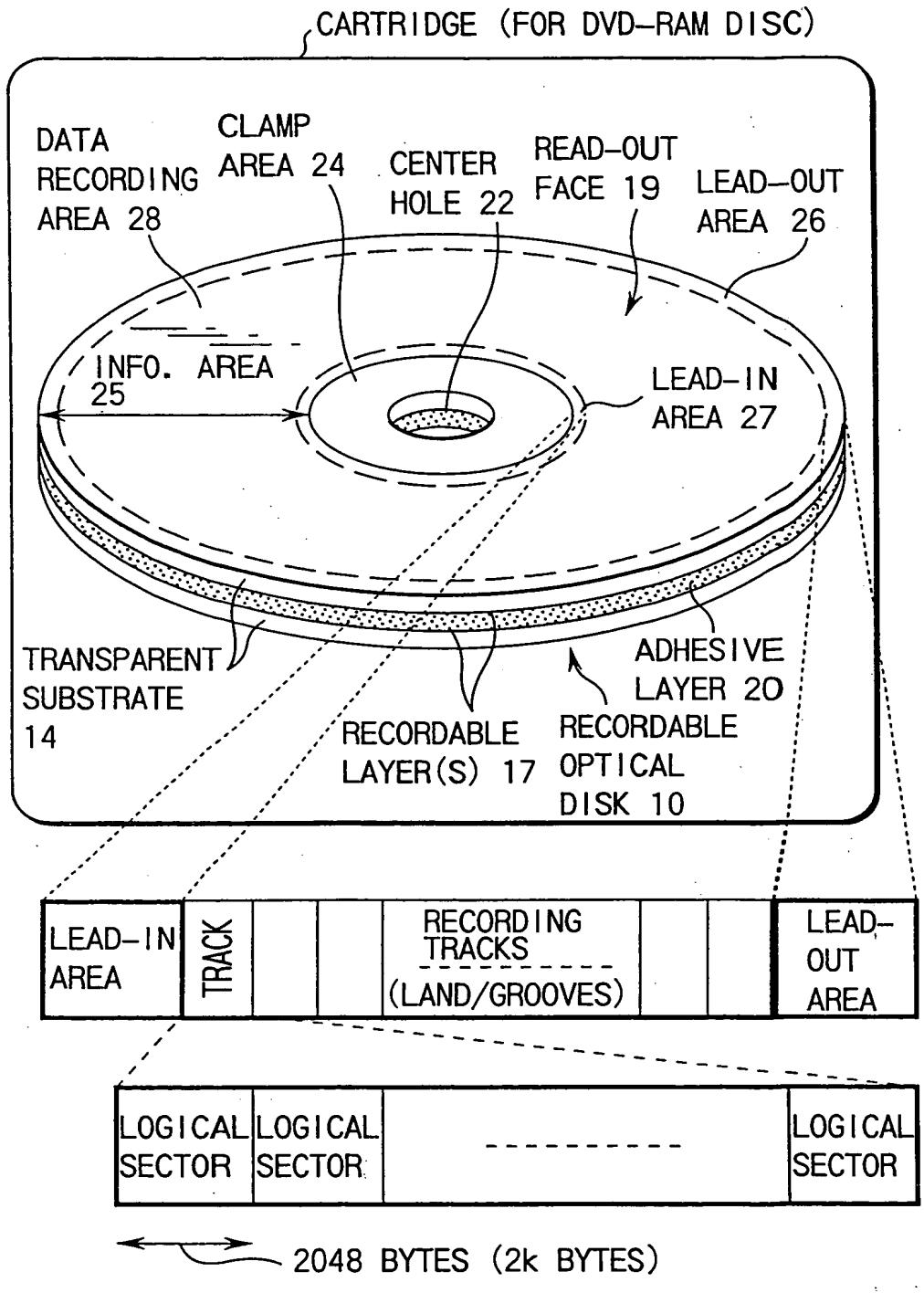
CARTRIDGE (FOR DVD-RAM DISC)
DATA RECORDING AREA 28
CLAMP AREA 24
CENTER HOLE 22
READ-OUT FACE 19
LEAD-OUT AREA 26
INFO. AREA 25
LEAD-IN AREA 27
TRANSPARENT SUBSTRATE 14
RECORDABLE LAYER(S) 17
ADHESIVE LAYER 20
RECORDABLE OPTICAL DISK 10
LEAD-IN AREA
TRACK
RECORDING TRACKS
(LAND/GROOVES)
LEAD-OUT AREA
LOGICAL SECTOR
LOGICAL SECTOR
LOGICAL SECTOR
2048 BYTES (2k BYTES)

FIG. 1

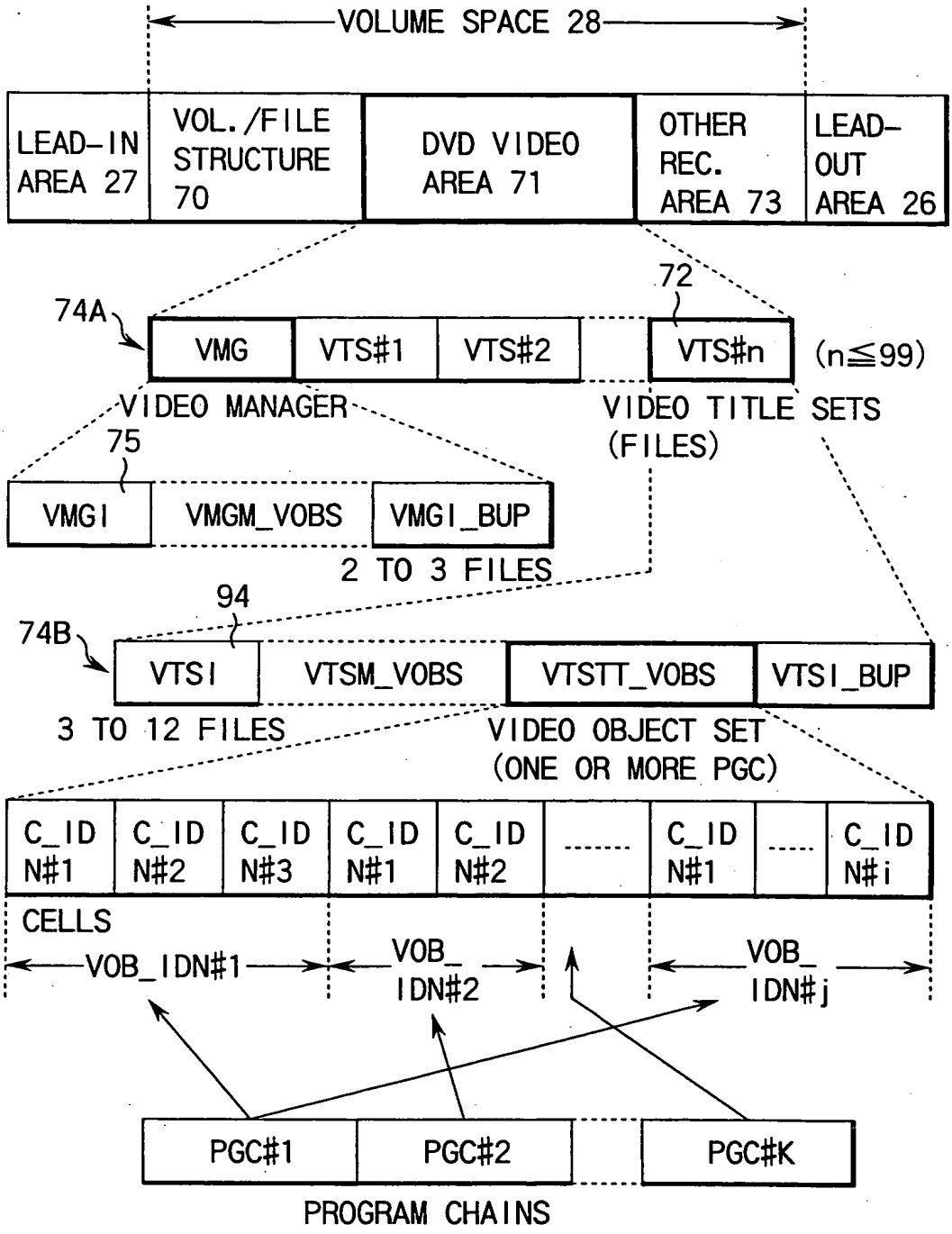
VOLUME SPACE 28
LEAD-IN AREA 27
VOL./FILE STRUCTURE 70
DVD VIDEO AREA 71
OTHER REC. AREA 73
LEAD-OUT AREA 26
74A
72
VMG
VTS#1
VTS#2
VTS#n
(n≦99)
VIDEO MANAGER
VIDEO TITLE SETS (FILES)
75
VMGI
VMGM_VOBS
VMGI_BUP
2 TO 3 FILES
94
74B
VTSI
VTSM_VOBS
VTSTT_VOBS
VTSI_BUP
3 TO 12 FILES
VIDEO OBJECT SET (ONE OR MORE PGC)
C_ID N#1
C_ID N#2
C_ID N#3
C_ID N#1
C_ID N#2
C_ID N#1
C_ID N#i
CELLS
VOB_IDN#1
VOB_IDN#2
VOB_IDN#j
PGC#1
PGC#2
PGC#K
PROGRAM CHAINS

FIG. 2

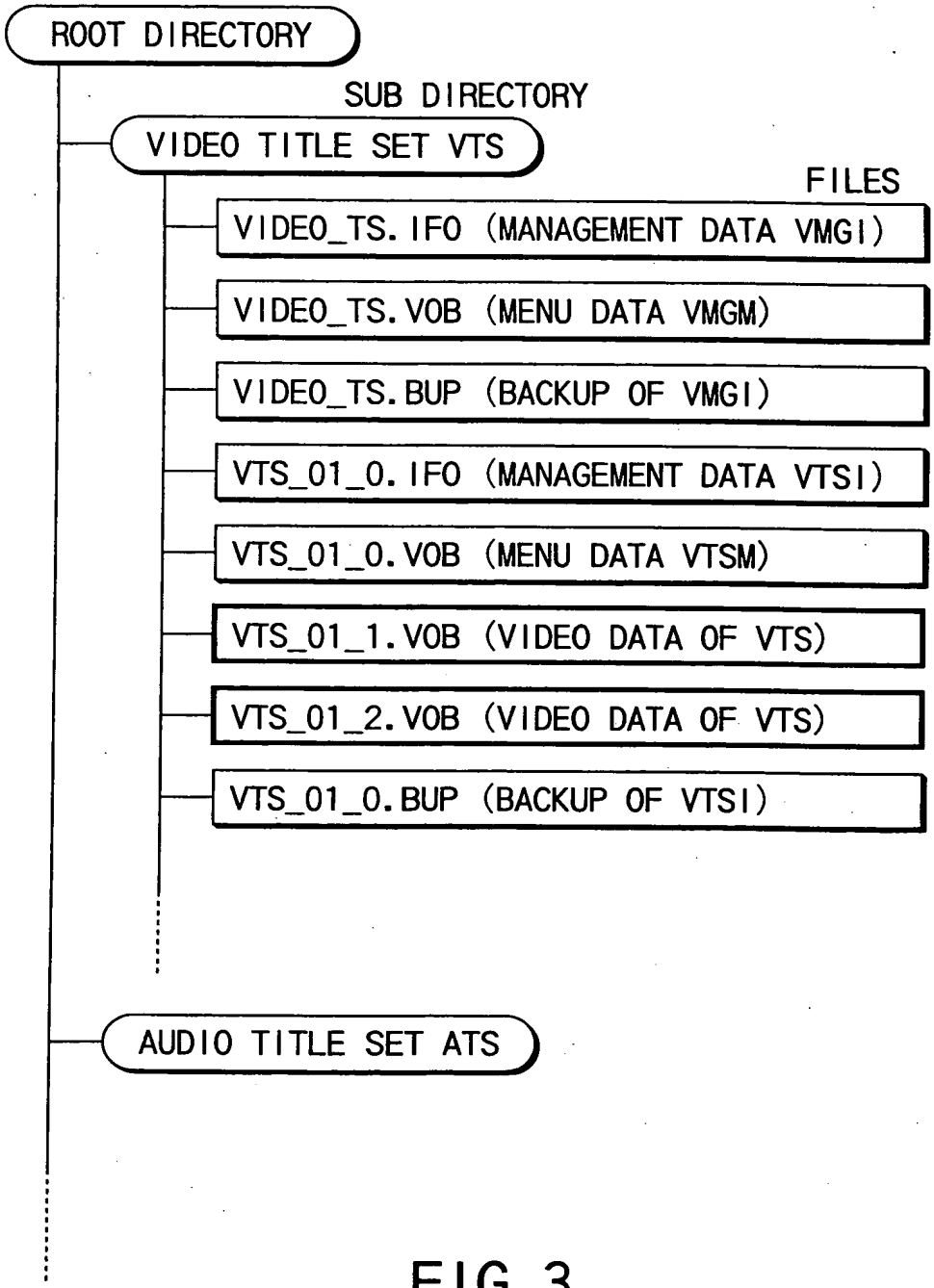
ROOT DIRECTORY
SUB DIRECTORY
VIDEO TITLE SET VTS
FILES
VIDEO_TS.IFO (MANAGEMENT DATA VMGI)
VIDEO_TS.VOB (MENU DATA VMGM)
VIDEO_TS.BUP (BACKUP OF VMGI)
VTS_01_0.IFO (MANAGEMENT DATA VTSI)
VTS_01_0.VOB (MENU DATA VTSM)
VTS_01_1.VOB (VIDEO DATA OF VTS)
VTS_01_2.VOB (VIDEO DATA OF VTS)
VTS_01_0.BUP (BACKUP OF VTSI)
AUDIO TITLE SET ATS

FIG. 3

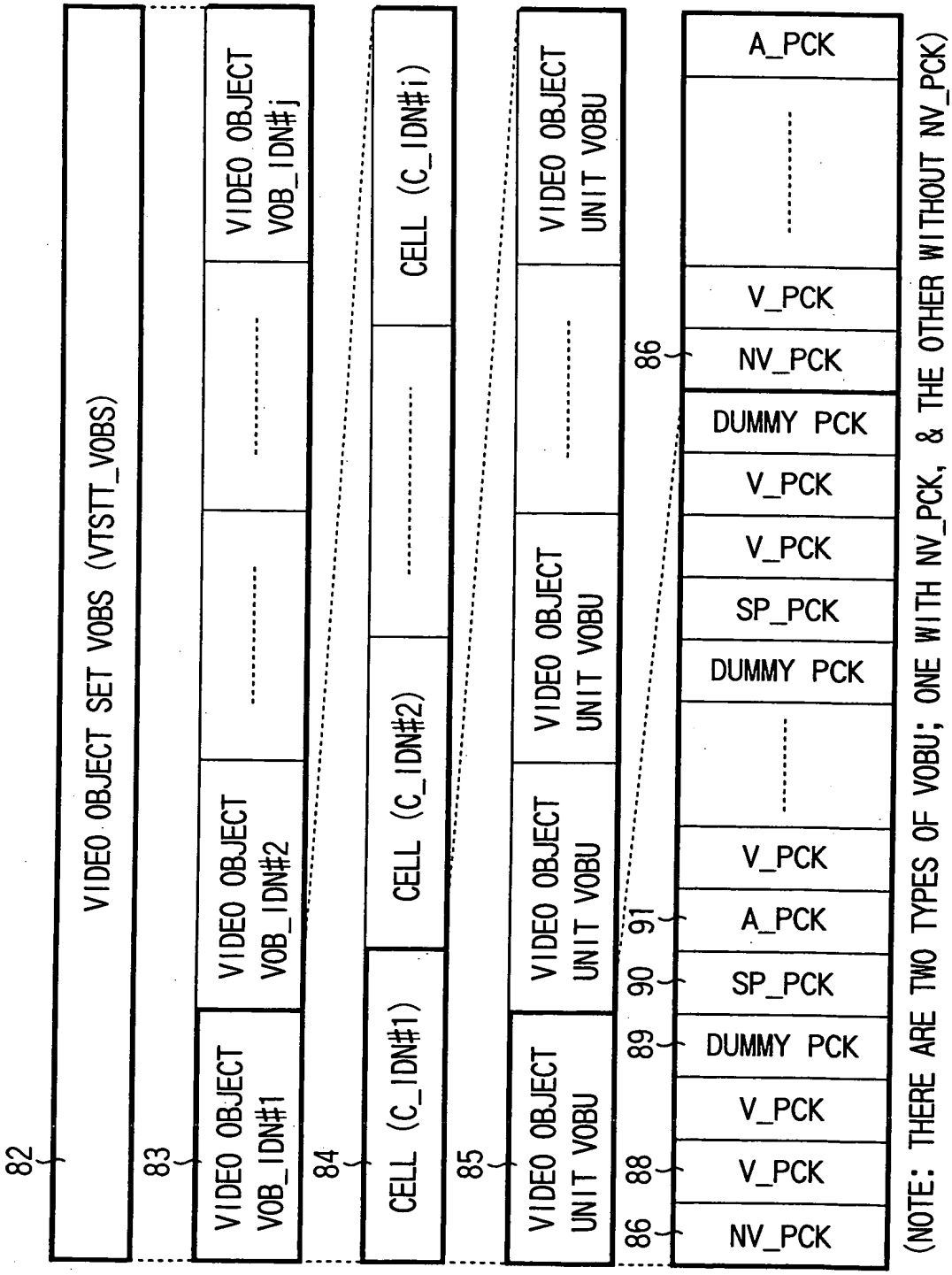
VIDEO OBJECT SET VOBS (VTSTT_VOBS)
82
VIDEO OBJECT VOB_IDN#1
VIDEO OBJECT VOB_IDN#2
VIDEO OBJECT VOB_IDN#j
83
CELL (C_IDN#1)
CELL (C_IDN#2)
CELL (C_IDN#i)
84
VIDEO OBJECT UNIT VOBU
VIDEO OBJECT UNIT VOBU
VIDEO OBJECT UNIT VOBU
85
NV_PCK
V_PCK
V_PCK
SP_PCK
DUMMY PCK
V_PCK
A_PCK
SP_PCK
DUMMY PCK
V_PCK
V_PCK
NV_PCK
86
88
89
90
91
A_PCK
V_PCK
NV_PCK
DUMMY PCK
V_PCK
V_PCK
SP_PCK
DUMMY PCK
V_PCK
(NOTE: THERE ARE TWO TYPES OF VOBU; ONE WITH NV_PCK, & THE OTHER WITHOUT NV_PCK)

FIG. 4

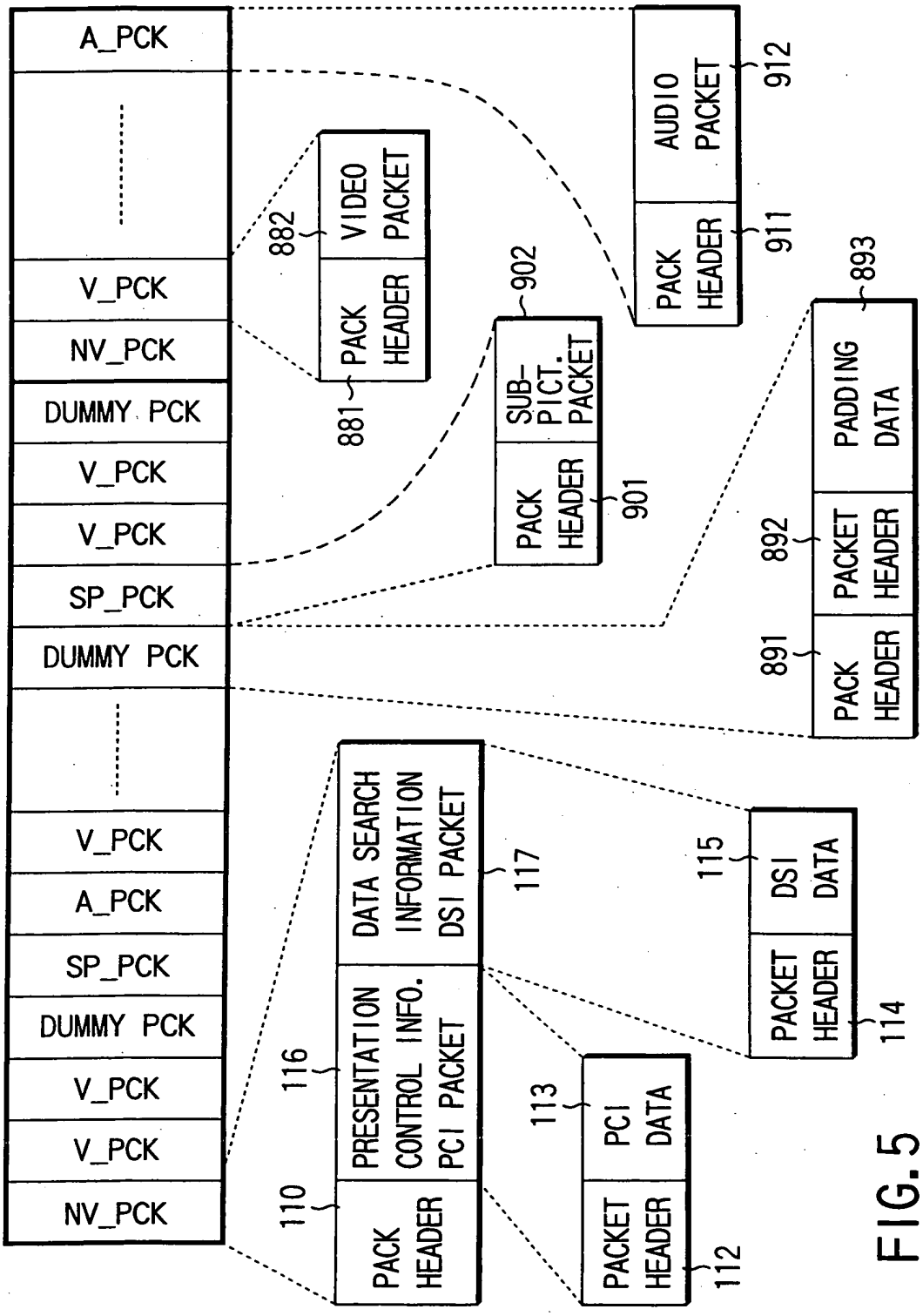
A_PCK
V_PCK
NV_PCK
DUMMY PCK
V_PCK
V_PCK
SP_PCK
DUMMY PCK
V_PCK
A_PCK
SP_PCK
DUMMY PCK
V_PCK
V_PCK
NV_PCK
VIDEO PACKET
PACK HEADER
881
882
SUB-PICT. PACKET
PACK HEADER
901
902
AUDIO PACKET
PACK HEADER
911
912
PADDING DATA
PACKET HEADER
PACK HEADER
891
892
893
DATA SEARCH INFORMATION DSI PACKET
PRESENTATION CONTROL INFO. PCI PACKET
PACK HEADER
110
116
117
PCI DATA
PACKET HEADER
112
113
DSI DATA
PACKET HEADER
114
115

FIG. 5

CONTENTS OF PRESENTATION CONTROL INFORMATION PCI

| SYMBOL | CONTENTS |
|---|---|
| PCI_GI | PCI GENERAL INFORMATION |
| NSML_AGLI | ANGLE INFO. FOR NONSEAMLESS |
| HLI | HIGHLIGHT INFORMATION |
| RECI | RECORDING INFORMATION |

FIG. 6

CONTENTS OF PRESENTATION CONTROL INFORMATION GENERAL INFORMATION PCI_GI

| SYMBOL | CONTENTS |
|---|---|
| NV_PCK_LBN | LOGICAL BLOCK NUMBER OF NAVIGATION PACK |
| VOBU_CAT | CATEGORY OF VOBU |
| RESERVED | RESERVED |
| VOBU_UOP_CTL | USER OPERATION CONTROL OF VOBU |
| VOBU_S_PTM | START PTM OF VOBU |
| VOBU_E_PTM | END PTM OF VOBU |
| VOBU_SE_E_PTM | END PTM OF SEQUENCE END IN VOBU |
| C_ELTM | CELL ELAPSE TIME |
| RESERVED | RESERVED |

FIG. 7

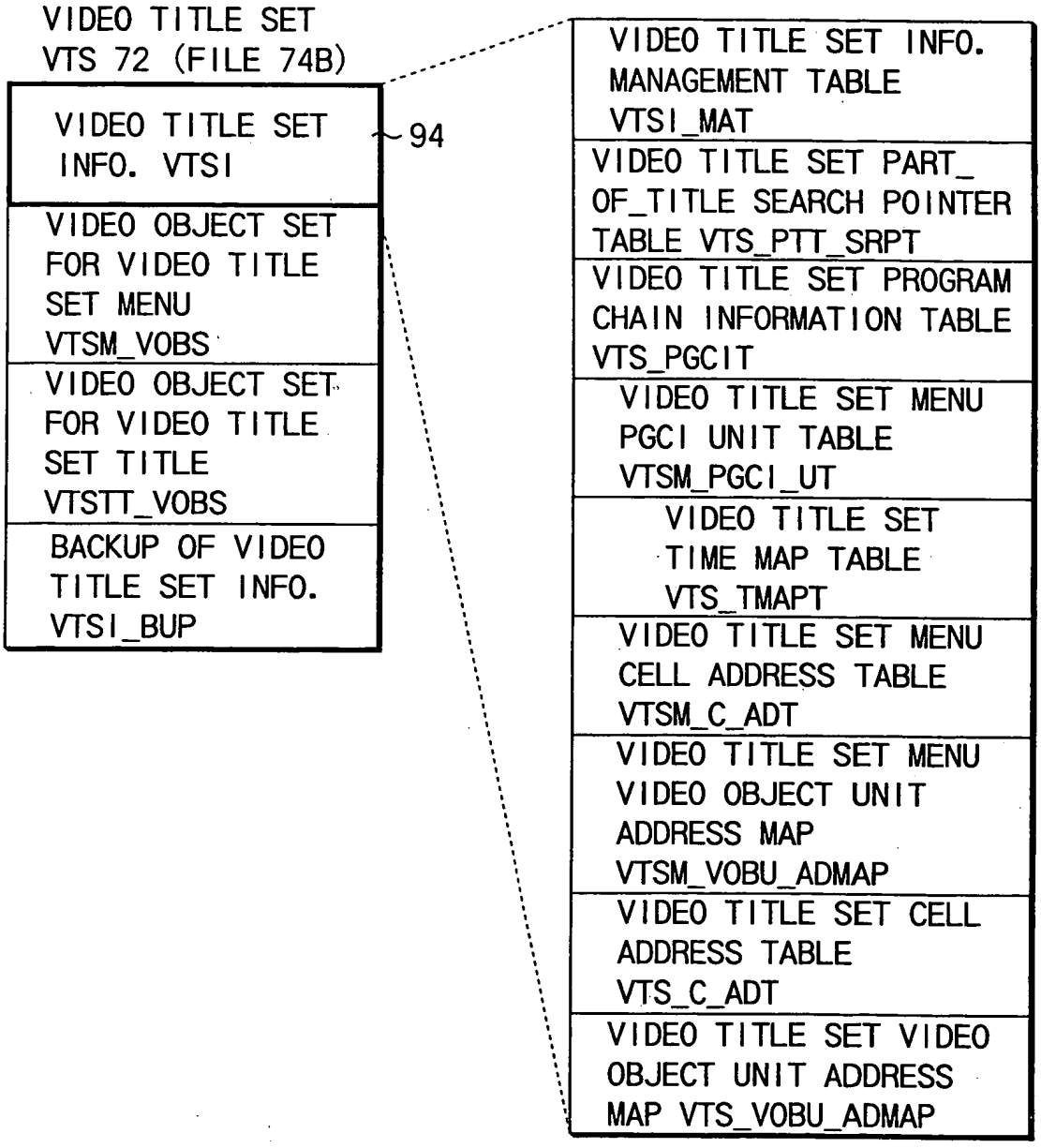
VIDEO TITLE SET
VTS 72 (FILE 74B)
VIDEO TITLE SET INFO. VTSI
94
VIDEO OBJECT SET FOR VIDEO TITLE SET MENU VTSM_VOBS
VIDEO OBJECT SET FOR VIDEO TITLE SET TITLE VTSTT_VOBS
BACKUP OF VIDEO TITLE SET INFO. VTSI_BUP
VIDEO TITLE SET INFO. MANAGEMENT TABLE VTSI_MAT
VIDEO TITLE SET PART_ OF_TITLE SEARCH POINTER TABLE VTS_PTT_SRPT
VIDEO TITLE SET PROGRAM CHAIN INFORMATION TABLE VTS_PGCIT
VIDEO TITLE SET MENU PGCI UNIT TABLE VTSM_PGCI_UT
VIDEO TITLE SET TIME MAP TABLE VTS_TMAPT
VIDEO TITLE SET MENU CELL ADDRESS TABLE VTSM_C_ADT
VIDEO TITLE SET MENU VIDEO OBJECT UNIT ADDRESS MAP VTSM_VOBU_ADMAP
VIDEO TITLE SET CELL ADDRESS TABLE VTS_C_ADT
VIDEO TITLE SET VIDEO OBJECT UNIT ADDRESS MAP VTS_VOBU_ADMAP

FIG. 8

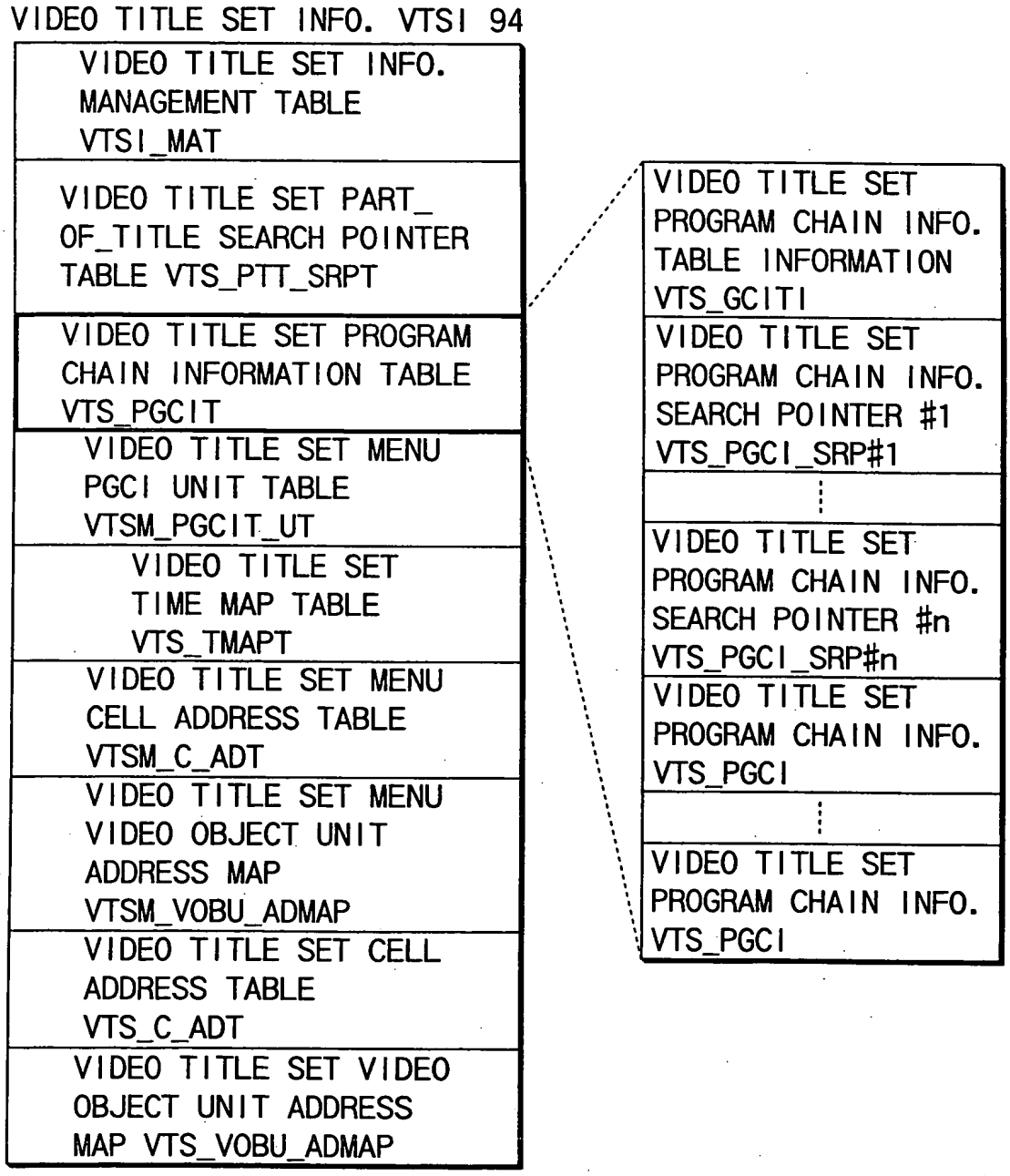
VIDEO TITLE SET INFO. VTSI 94
VIDEO TITLE SET INFO. MANAGEMENT TABLE VTSI_MAT
VIDEO TITLE SET PART_ OF_TITLE SEARCH POINTER TABLE VTS_PTT_SRPT
VIDEO TITLE SET PROGRAM CHAIN INFORMATION TABLE VTS_PGCIT
VIDEO TITLE SET MENU PGCI UNIT TABLE VTSM_PGCIT_UT
VIDEO TITLE SET TIME MAP TABLE VTS_TMAPT
VIDEO TITLE SET MENU CELL ADDRESS TABLE VTSM_C_ADT
VIDEO TITLE SET MENU VIDEO OBJECT UNIT ADDRESS MAP VTSM_VOBU_ADMAP
VIDEO TITLE SET CELL ADDRESS TABLE VTS_C_ADT
VIDEO TITLE SET VIDEO OBJECT UNIT ADDRESS MAP VTS_VOBU_ADMAP
VIDEO TITLE SET PROGRAM CHAIN INFO. TABLE INFORMATION VTS_GCITI
VIDEO TITLE SET PROGRAM CHAIN INFO. SEARCH POINTER #1 VTS_PGCI_SRP#1
VIDEO TITLE SET PROGRAM CHAIN INFO. SEARCH POINTER #n VTS_PGCI_SRP#n
VIDEO TITLE SET PROGRAM CHAIN INFO. VTS_PGCI
VIDEO TITLE SET PROGRAM CHAIN INFO. VTS_PGCI

FIG. 9

STRUCTURE OF PROGRAM CHAIN INFO. PGCI

| |
|---|
| PROGRAM CHAIN GENERAL INFO. PGC_GI |
| PROGRAM CHAIN COMMAND TABLE PGC_CMDT |
| PROGRAM CHAIN PROGRAM MAP PGC_PGMAP |
| CELL PLAYBACK INFO. TABLE C_PBIT |
| CELL POSITION INFO. TABLE C_POSIT |

FIG. 10

CONTENTS OF CELL PLAYBACK INFO. TABLE C_PBIT

| |
|---|
| CELL PLAYBACK INFO. #1 (C_PBI#1) |
| CELL PLAYBACK INFO. #2 (C_PBI#2) |
| ⋮ |
| CELL PLAYBACK INFO. #n (C_PBI#n) |

FIG. 11

CONTENTS OF CELL PLAYBACK INFORMATION C_PBI

| SYMBOL | CONTENTS |
|---|---|
| C_CAT | CELL CATEGORY |
| C_PBTM | CELL PLAYBACK TIME |
| C_FVOBU_SA | START ADR. OF 1ST VOBU IN CELL |
| C_FILVU_EA | END ADR. OF 1ST ILVU IN CELL |
| C_LVOBU_SA | START ADR. OF LAST VOBU IN CELL |
| C_LVOBU_EA | END ADR. OF LAST VOBU IN CELL |
| CELL TYPE | ERASION LEVEL FLAG<br>00h=PLAYBACK IS PERMITTED & AUTOMATIC ERASION IS PROHIBITED<br>01h=PLAYBACK IS PERMITTED & AUTOMATIC ERASION IS PROHIBITED |

FIG. 12

CONTENTS OF CELL CATEGORY C_CAT

| b31 b30 | b29 b28 | b27 | b26 | b25 | b24 |
|---|---|---|---|---|---|
| CELL BLOCK MODE | CELL BLOCK TYPE | SEAMLESS PLAYBACK FLAG | INTER-LEAVED ALLOCATION FLAG | STS DISCONTI-NUITY FLAG | SEAMLESS ANGLE CHANGE FLAG |

| b23 | b22 b21 | b20 | b16 |
|---|---|---|---|
| RESERVED | CELL PLAY-BACK MODE | ACCESS RESTRICTION FLAG | CELL TYPE |

| b15 | b8 |
|---|---|
| CELL STILL TIME | |

| b7 | b0 |
|---|---|
| CELL COMMAND NUMBER | |

FIG. 13

CONTENTS OF PROGRAM CHAIN GENERAL INFO. PGC_GI

| SYMBOL | CONTENTS |
|---|---|
| PGC_CNT | PGC CONTENTS |
| PGC_PB_TM | PGC PLAYBACK TIME |
| PGC_UOP_CTL | PGC USER OPERATION CONTROL |
| PGC_AST_CTLT | PGC AUDIO STREAM CONTROL TABLE |
| PGC_SPST_CTLT | PGC SUB-PICT. STREAM CONTROL TABLE |
| PGC_NV_CTL | PGC NAVIGATION CONTROL |
| PGC_SP_PLT | PGC SUB-PICTURE PALETTE |
| PGC_CMDT_SA | START ADR. OF PGC COMMAND TABLE |
| PGC_PGMAP_SA | START ADR. OF PROGRAM MAP |
| C_PBIT_SA | START ADR. OF CELL PLAYBACK TABLE |
| C_POSIT_SA | START ADR. OF CELL POS. INFO. TABLE |

FIG. 14

CONTENTS OF PGC GENERAL INFO. PGC_GI FOR TRASH PGC

| SYMBOL | CONTENTS |
|---|---|
| PGC_CNT | PGC CONTENTS |
| PGC_PB_TM | PGC PLAYBACK TIME |
| PGC_UOP_CTL | PGC USER OPERATION CONTROL |
| PGC_AST_CTLT | PGC AUDIO STREAM CONTROL TABLE |
| PGC_SPST_CTLT | PGC SUB-PICT. STREAM CONTROL TABLE |
| PGC_NV_CTL | PGC NAVIGATION CONTROL |
| PGC_SP_PLT | PGC SUB-PICTURE PALETTE |
| PGC_CMDT_SA | START ADR. OF PGC COMMAND TABLE |
| PGC_PGMAP_SA | START ADR. OF PROGRAM MAP |
| C_PBIT_SA | START ADR. OF CELL PLAYBACK TABLE |
| C_POSIT_SA | START ADR. OF CELL POS. INFO. TABLE |
| TRASH_PGC_FLG | TRASH PGC FLAG<br>01h=TRASH PGC<br>00h=CONVENTIONAL PGC |

FIG. 15

CONTENTS OF C_PBI FOR TRASH PGC

| SYMBOL | CONTENTS |
|---|---|
| C_CAT | PGC CATEGORY |
| C_PBTM | PGC PLAYBACK TIME |
| C_FVOBU_SA | START ADR. OF 1ST VOBU IN CELL |
| C_FILVU_EA | END ADR. OF 1ST ILVU IN CELL |
| C_LVOBU_SA | START ADR. OF LAST VOBU IN CELL |
| C_LVOBU_EA | END ADR. OF LAST VOBU IN CELL |
| PGC_N | ORIGINAL PGC NUMBER OF CURRENT CELL |
| C_ID_N | CORRESPONDING CELL NUMBER OF ORIGINAL PGC |

FIG. 16

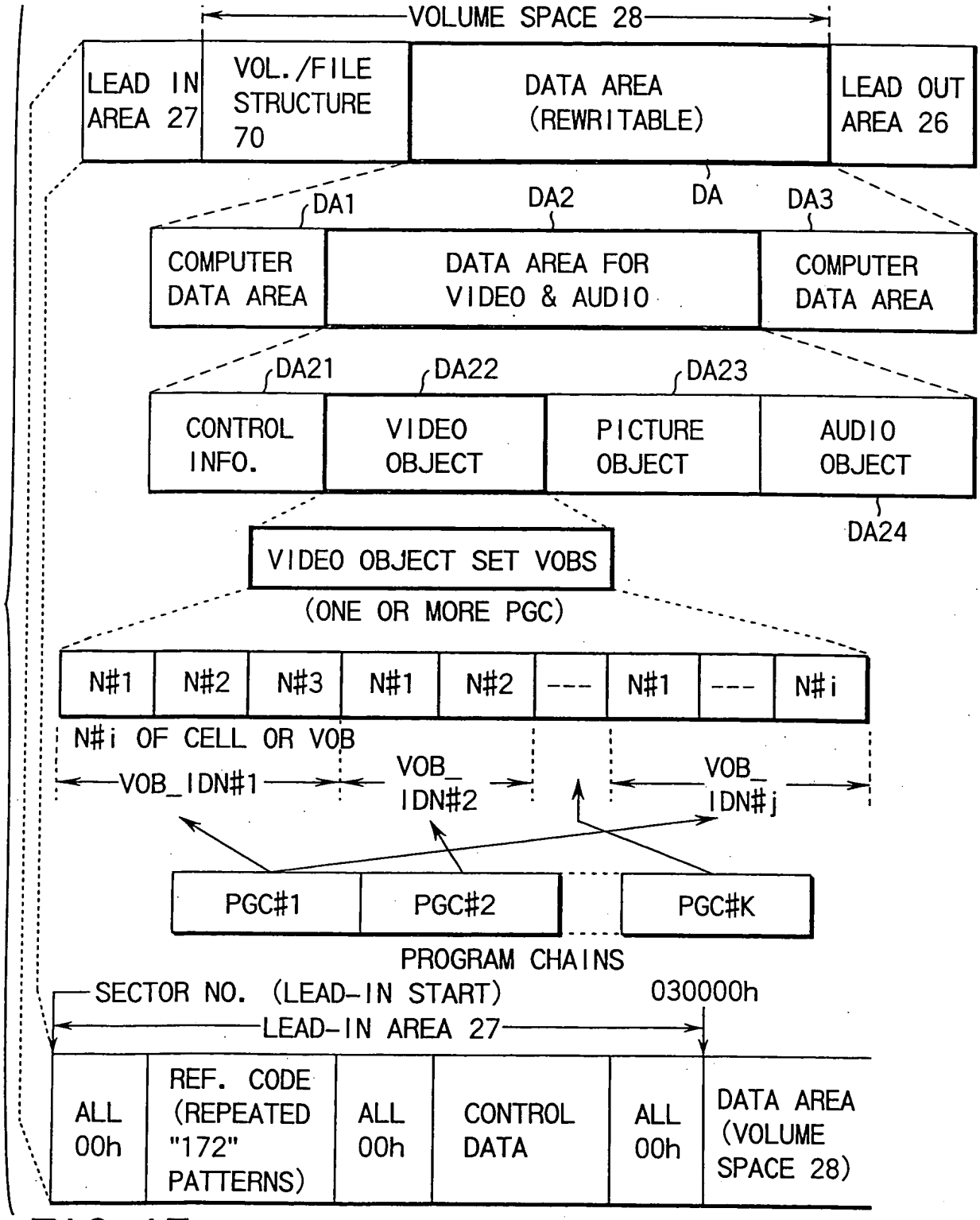
VOLUME SPACE 28
LEAD IN AREA 27
VOL./FILE STRUCTURE 70
DATA AREA (REWRITABLE)
LEAD OUT AREA 26
DA1
DA2
DA
DA3
COMPUTER DATA AREA
DATA AREA FOR VIDEO & AUDIO
COMPUTER DATA AREA
DA21
DA22
DA23
CONTROL INFO.
VIDEO OBJECT
PICTURE OBJECT
AUDIO OBJECT
DA24
VIDEO OBJECT SET VOBS
(ONE OR MORE PGC)
N#1
N#2
N#3
N#1
N#2
---
N#1
---
N#i
N#i OF CELL OR VOB
VOB_IDN#1
VOB_ IDN#2
VOB_ IDN#j
PGC#1
PGC#2
PGC#K
PROGRAM CHAINS
SECTOR NO. (LEAD-IN START)
030000h
LEAD-IN AREA 27
ALL 00h
REF. CODE (REPEATED "172" PATTERNS)
ALL 00h
CONTROL DATA
ALL 00h
DATA AREA (VOLUME SPACE 28)

FIG. 17

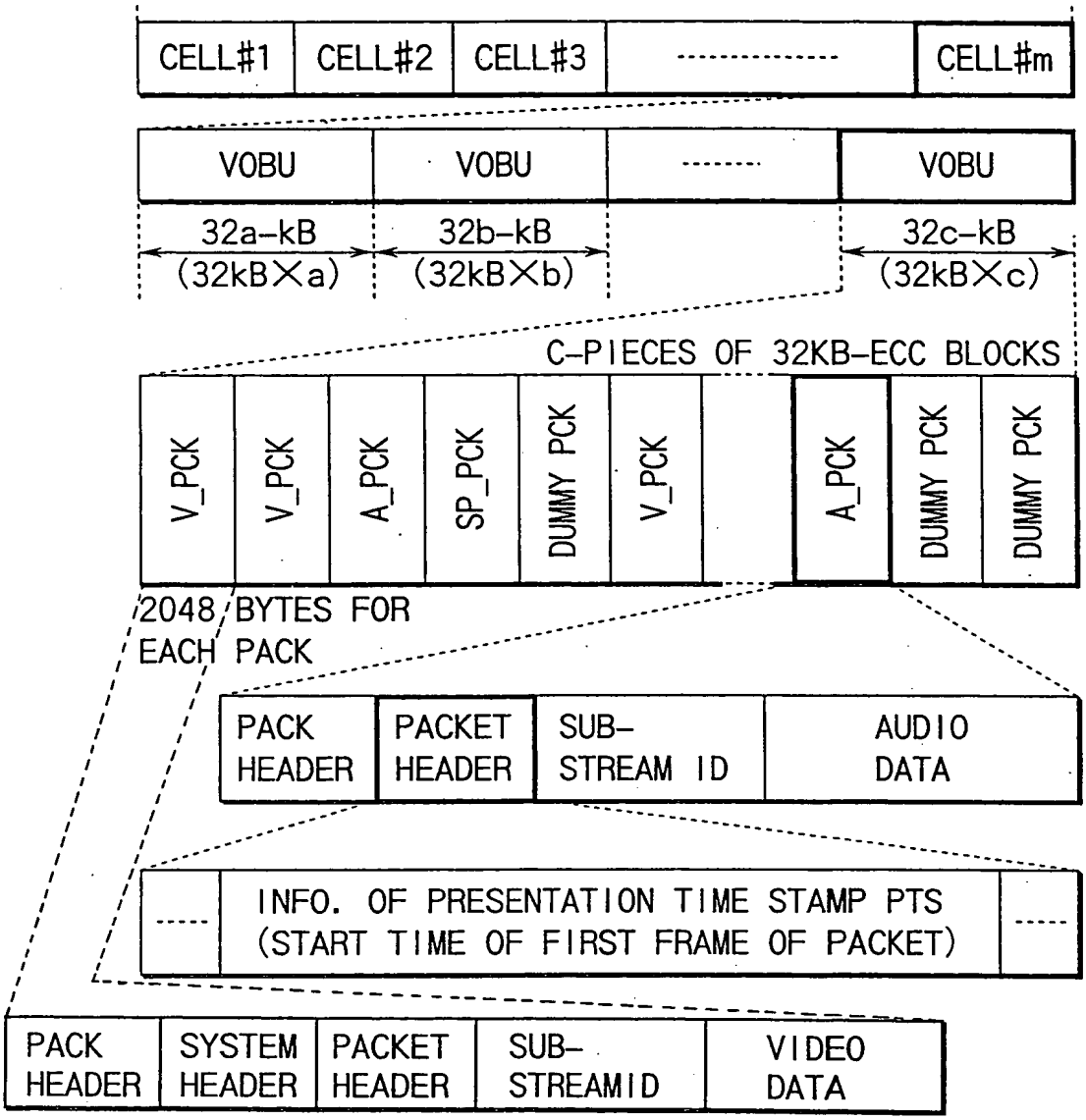
CELL#1
CELL#2
CELL#3
CELL#m
VOBU
VOBU
VOBU
32a-kB
(32kB×a)
32b-kB
(32kB×b)
32c-kB
(32kB×c)
C-PIECES OF 32KB-ECC BLOCKS
V_PCK
V_PCK
A_PCK
SP_PCK
DUMMY PCK
V_PCK
A_PCK
DUMMY PCK
DUMMY PCK
2048 BYTES FOR EACH PACK
PACK HEADER
PACKET HEADER
SUB-STREAM ID
AUDIO DATA
INFO. OF PRESENTATION TIME STAMP PTS (START TIME OF FIRST FRAME OF PACKET)
PACK HEADER
SYSTEM HEADER
PACKET HEADER
SUB-STREAMID
VIDEO DATA

FIG. 18

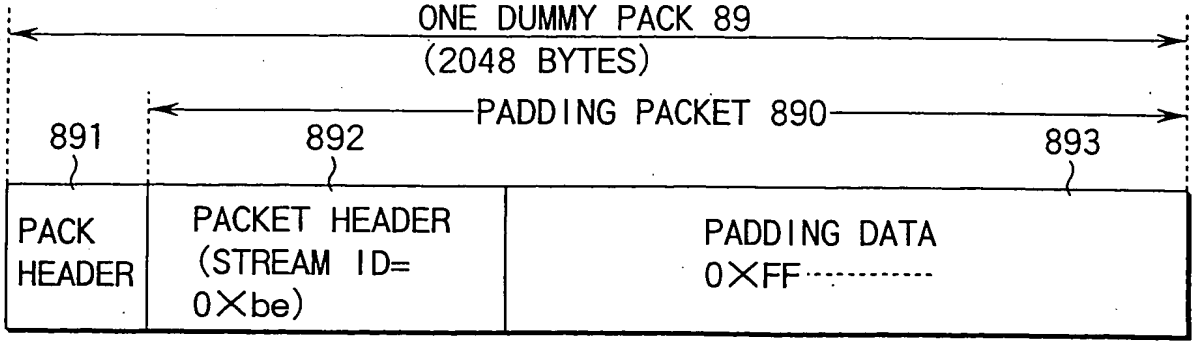
ONE DUMMY PACK 89
(2048 BYTES)
PADDING PACKET 890
891
892
893
PACK HEADER
PACKET HEADER (STREAM ID= 0×be)
PADDING DATA 0×FF

FIG. 19

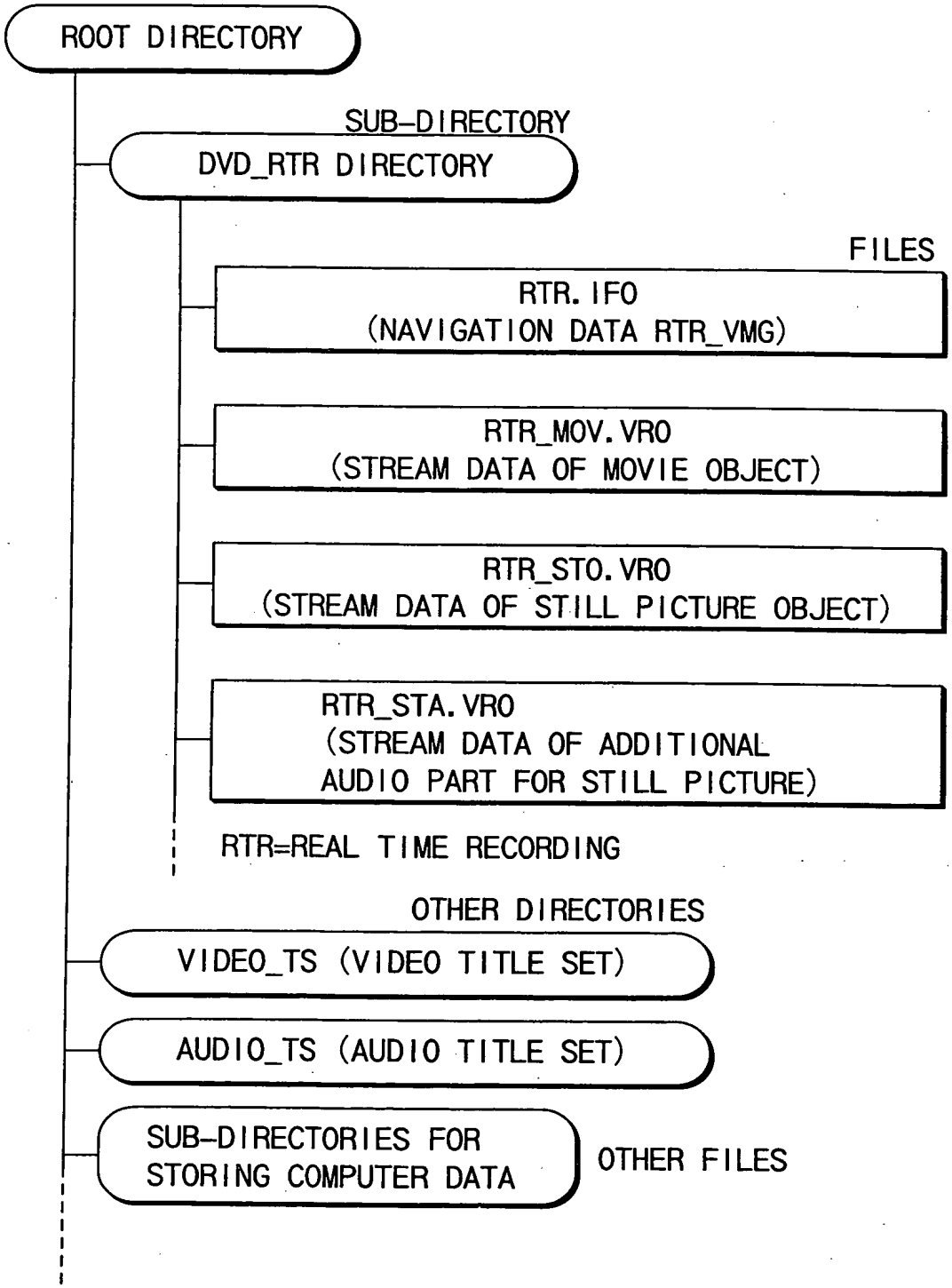
ROOT DIRECTORY
SUB-DIRECTORY
DVD_RTR DIRECTORY
FILES
RTR.IFO
(NAVIGATION DATA RTR_VMG)
RTR_MOV.VRO
(STREAM DATA OF MOVIE OBJECT)
RTR_STO.VRO
(STREAM DATA OF STILL PICTURE OBJECT)
RTR_STA.VRO
(STREAM DATA OF ADDITIONAL
AUDIO PART FOR STILL PICTURE)
RTR=REAL TIME RECORDING
OTHER DIRECTORIES
VIDEO_TS (VIDEO TITLE SET)
AUDIO_TS (AUDIO TITLE SET)
SUB-DIRECTORIES FOR
STORING COMPUTER DATA
OTHER FILES

FIG. 20

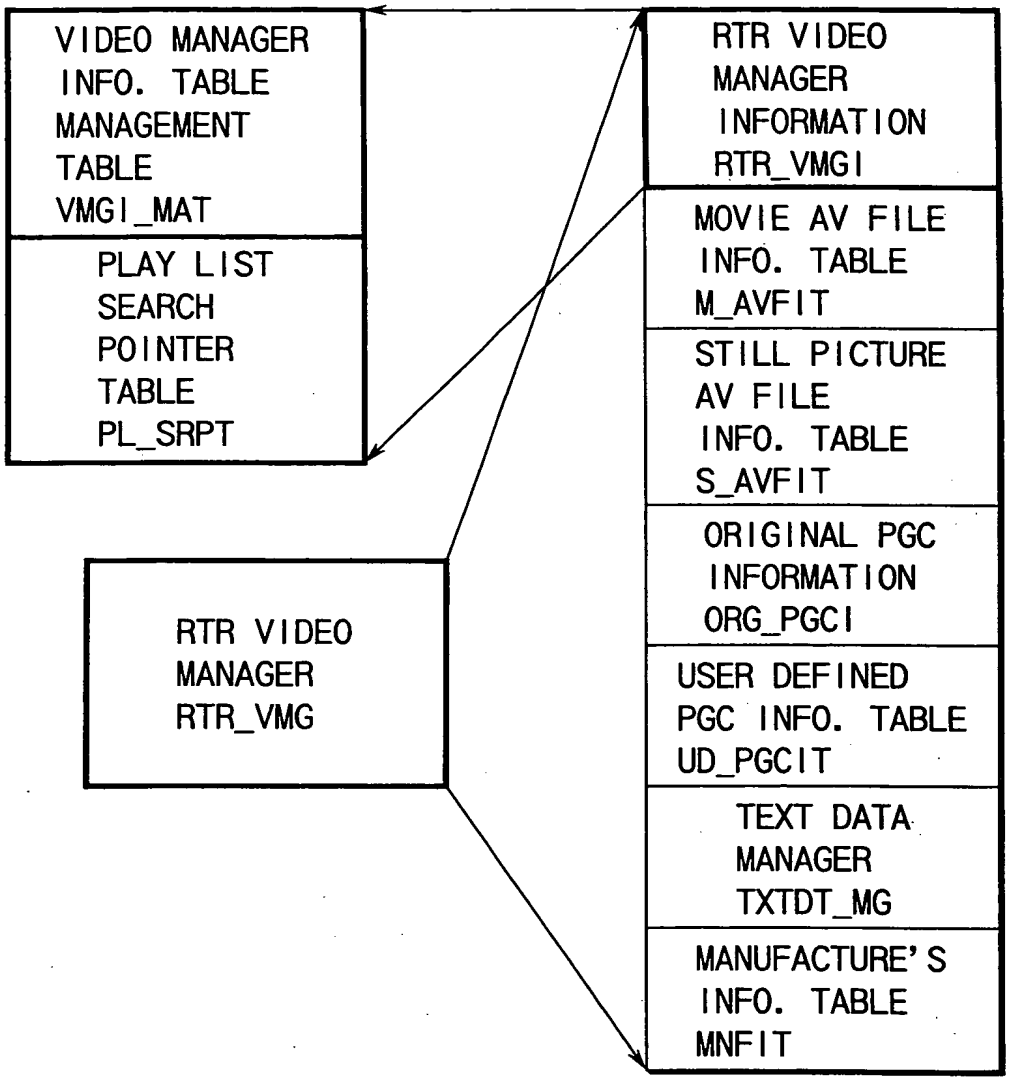
VIDEO MANAGER INFO. TABLE MANAGEMENT TABLE VMGI_MAT
PLAY LIST SEARCH POINTER TABLE PL_SRPT
RTR VIDEO MANAGER RTR_VMG
RTR VIDEO MANAGER INFORMATION RTR_VMGI
MOVIE AV FILE INFO. TABLE M_AVFIT
STILL PICTURE AV FILE INFO. TABLE S_AVFIT
ORIGINAL PGC INFORMATION ORG_PGCI
USER DEFINED PGC INFO. TABLE UD_PGCIT
TEXT DATA MANAGER TXTDT_MG
MANUFACTURE'S INFO. TABLE MNFIT

FIG. 21

CONTENTS OF VMGI_MAT

| FIELD NAME | CONTENTS |
|---|---|
| VMG_ID | VMG IDENTIFIER |
| RTR_VNG_EA | END ADDRESS OF RTR_VMG |
| RESERVED | RESERVED |
| VMGI_EA | END ADDRESS OF VMGI |
| VERN | VERSION NUMBER OF DVD SPEC. FOR VIDEO RECORDING |
| RESERVED | RESERVED |
| TM_ZONE | TIME ZONE |
| STILL_TM | STILL TIME FOR STILL PICTURES |
| CHRS | CHARACTER SET CODE FOR PRIMARY TEXT |
| RSM_MRKI | RESUME MARKER INFORMATION |
| REP_PICTI | DISC REPRESENTATIVE PICTURE INFORMATION |
| RESERVED | RESERVED |
| M_AVFIT_SA | START ADDRESS OF M_AVFIT |
| S_AVFIT_SA | START ADDRESS OF S_AVFIT |
| RESERVED | RESERVED |
| ORG_PGCI_SA | START ADDRESS OF ORG_PGCI |
| UD_PGCIT_SA | START ADDRESS OF UD_PGCIT |
| TXTDT_MG_SA | START ADDRESS OF TXTDT_MG |
| MNFIT_SA | START ADDRESS OF MNFIT |
| RESERVED | RESERVED |

FIG. 22

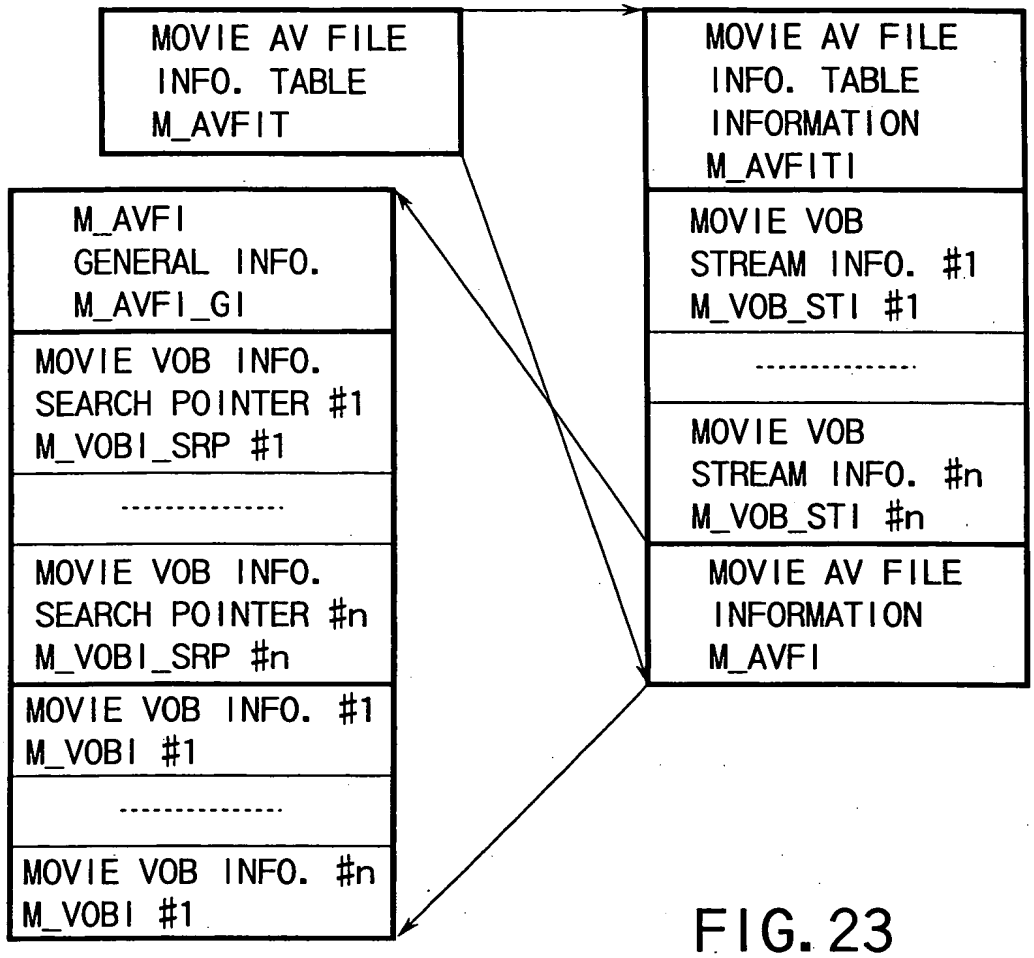
MOVIE AV FILE INFO. TABLE M_AVFIT
M_AVFI GENERAL INFO. M_AVFI_GI
MOVIE VOB INFO. SEARCH POINTER #1 M_VOBI_SRP #1
MOVIE VOB INFO. SEARCH POINTER #n M_VOBI_SRP #n
MOVIE VOB INFO. #1 M_VOBI #1
MOVIE VOB INFO. #n M_VOBI #1
MOVIE AV FILE INFO. TABLE INFORMATION M_AVFITI
MOVIE VOB STREAM INFO. #1 M_VOB_STI #1
MOVIE VOB STREAM INFO. #n M_VOB_STI #n
MOVIE AV FILE INFORMATION M_AVFI

FIG. 23

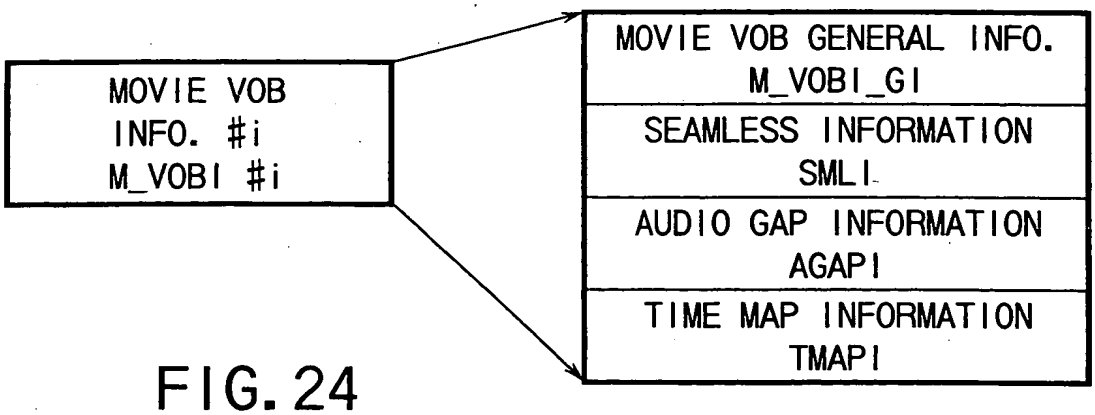
MOVIE VOB INFO. #i M_VOBI #i
MOVIE VOB GENERAL INFO. M_VOBI_GI
SEAMLESS INFORMATION SMLI
AUDIO GAP INFORMATION AGAPI
TIME MAP INFORMATION TMAPI

FIG. 24

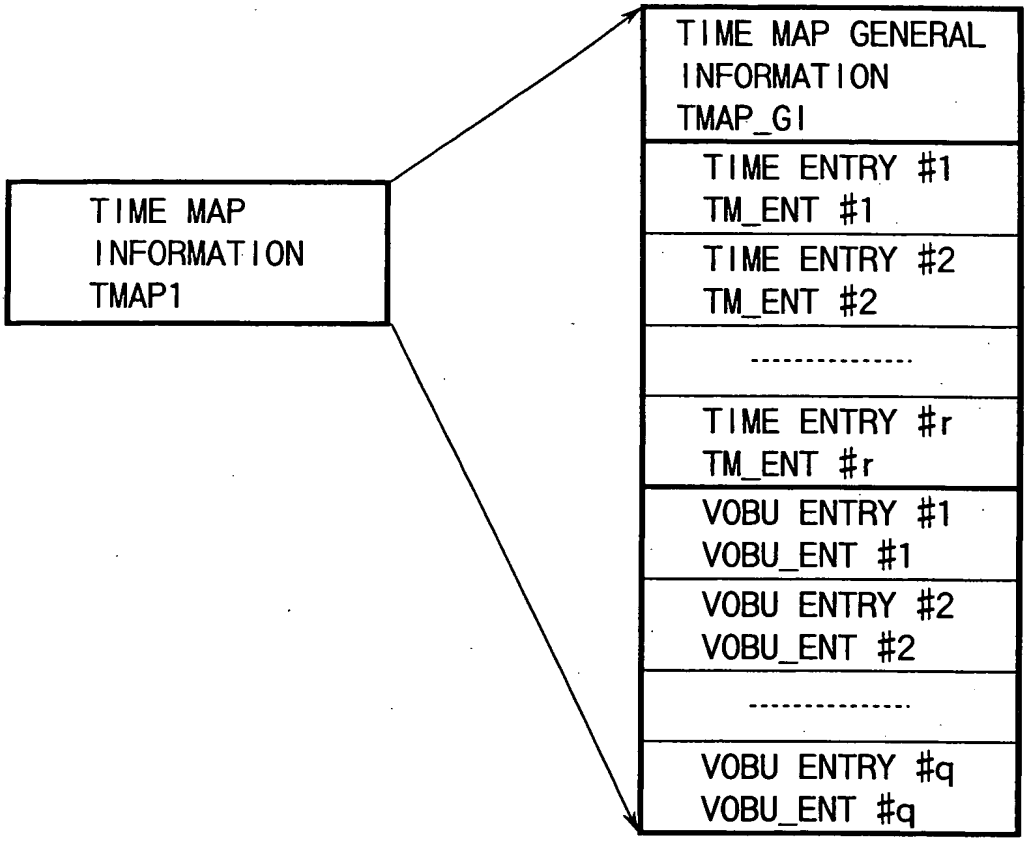
TIME MAP INFORMATION TMAP1
TIME MAP GENERAL INFORMATION TMAP_GI
TIME ENTRY #1 TM_ENT #1
TIME ENTRY #2 TM_ENT #2
TIME ENTRY #r TM_ENT #r
VOBU ENTRY #1 VOBU_ENT #1
VOBU ENTRY #2 VOBU_ENT #2
VOBU ENTRY #q VOBU_ENT #q

FIG. 25

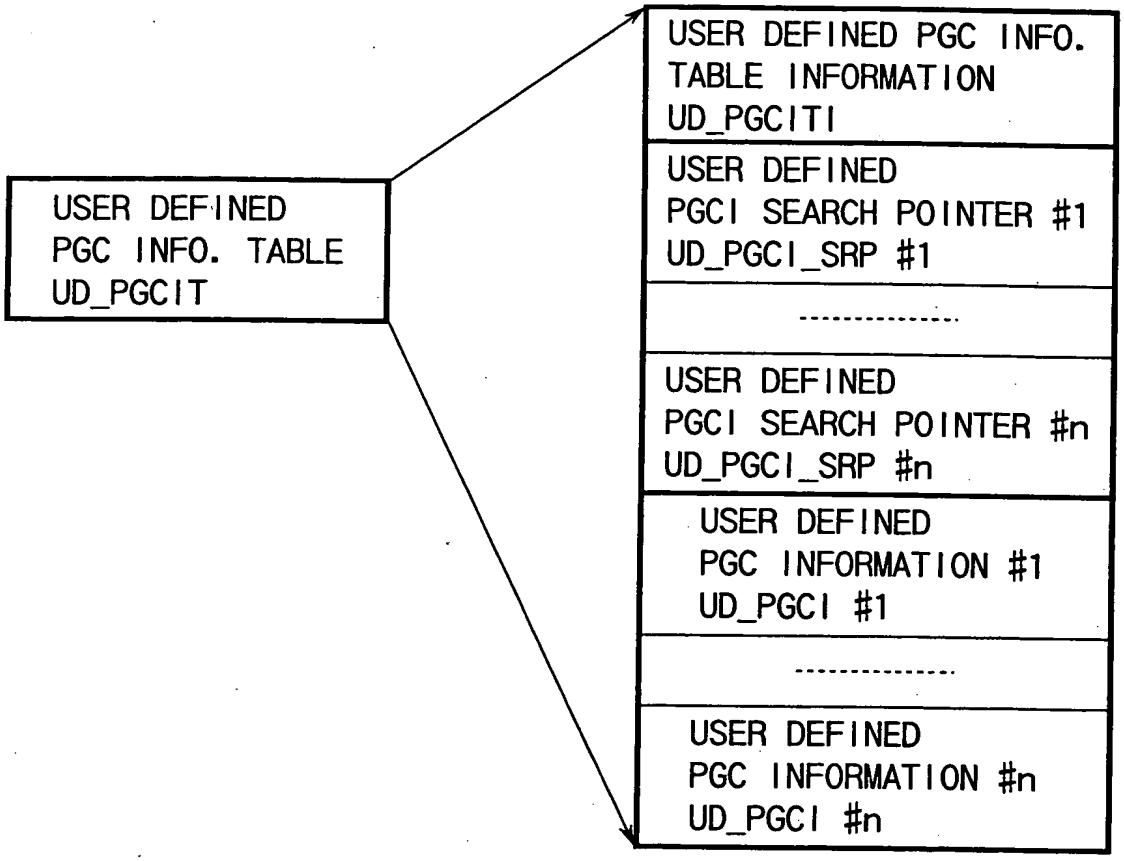
USER DEFINED
PGC INFO. TABLE
UD_PGCIT
USER DEFINED PGC INFO.
TABLE INFORMATION
UD_PGCITI
USER DEFINED
PGCI SEARCH POINTER #1
UD_PGCI_SRP #1
---
USER DEFINED
PGCI SEARCH POINTER #n
UD_PGCI_SRP #n
USER DEFINED
PGC INFORMATION #1
UD_PGCI #1
---
USER DEFINED
PGC INFORMATION #n
UD_PGCI #n

FIG. 26

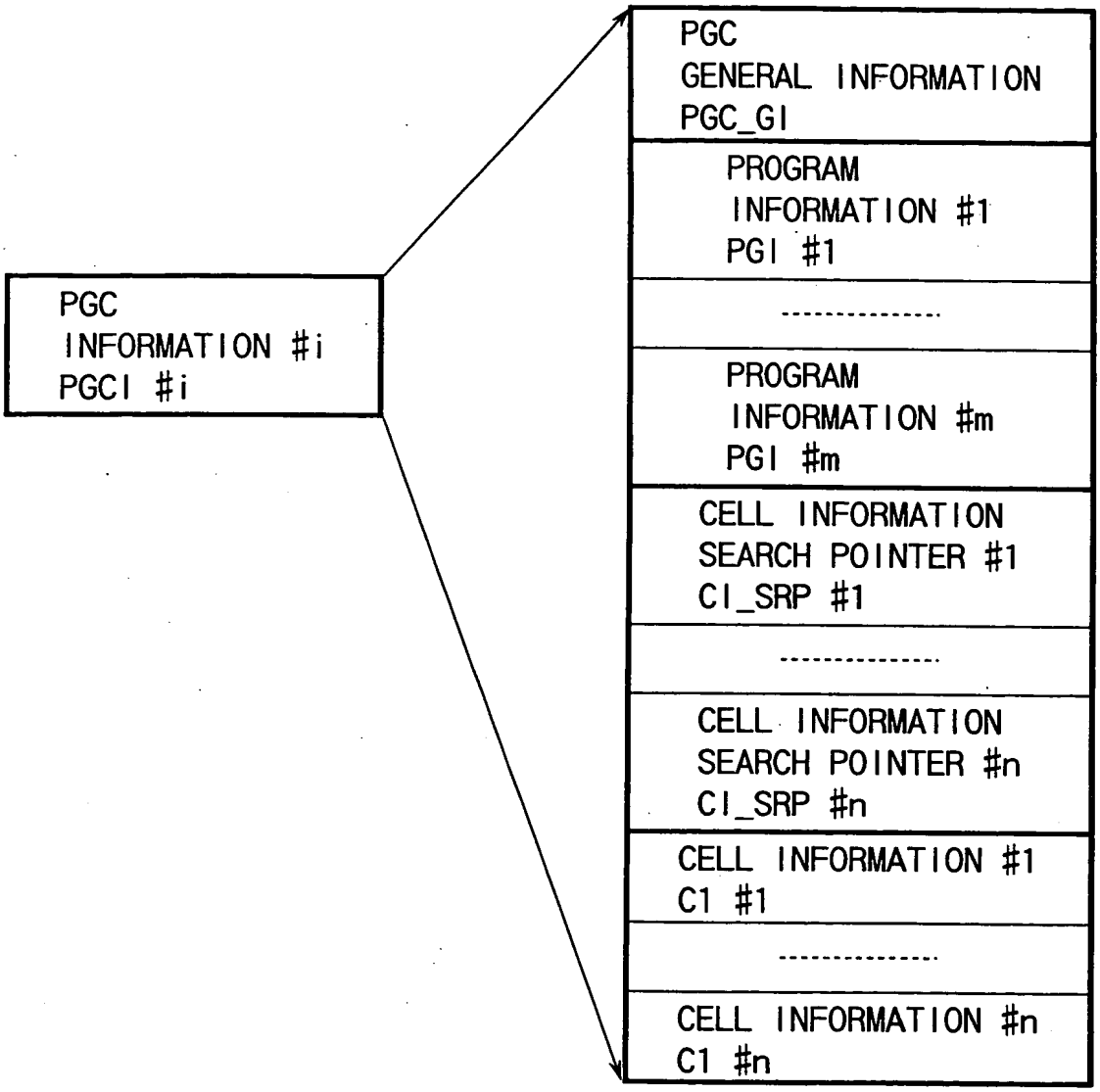
PGC
INFORMATION #i
PGCI #i
PGC
GENERAL INFORMATION
PGC_GI
PROGRAM
INFORMATION #1
PGI #1
.....
PROGRAM
INFORMATION #m
PGI #m
CELL INFORMATION
SEARCH POINTER #1
CI_SRP #1
.....
CELL INFORMATION
SEARCH POINTER #n
CI_SRP #n
CELL INFORMATION #1
C1 #1
.....
CELL INFORMATION #n
C1 #n

FIG. 27

CONTENTS OF PGC_GI

| FIELD NAME | CONTENTS |
|---|---|
| RESERVED | RESERVED |
| PG_Ns | NUMBER OF PROGRAMS |
| CI_SRP_Ns | NUMBER OF CI SEARCH POINTERS |
| TRASH_PGC_FLG | TRASH PGC FLAG<br>01h=TRASH PGC<br>00h=CONVENTIONAL PGC |

FIG. 28

CONTENTS OF PGI

| FIELD NAME | CONTENTS |
|---|---|
| RESERVED | RESERVED |
| PG_TY | PROGRAM TYPE |
| C_Ns | NUMBER OF CELLS IN PROGRAM |
| PRM_TXTI | PRIMARY TEXT INFORMATION |
| IT_TXT_SRPN | ITEM TEXT SRP NUMBER |
| THM_PTRI | THUMBNAIL POINTER INFORMATION |

FIG. 29

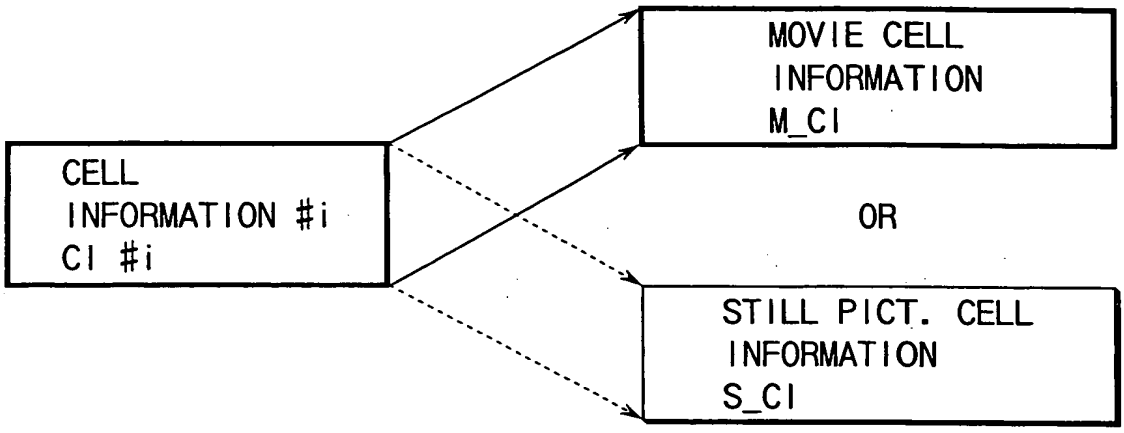
CELL
INFORMATION #i
CI #i
MOVIE CELL
INFORMATION
M_CI
OR
STILL PICT. CELL
INFORMATION
S_CI

FIG. 30

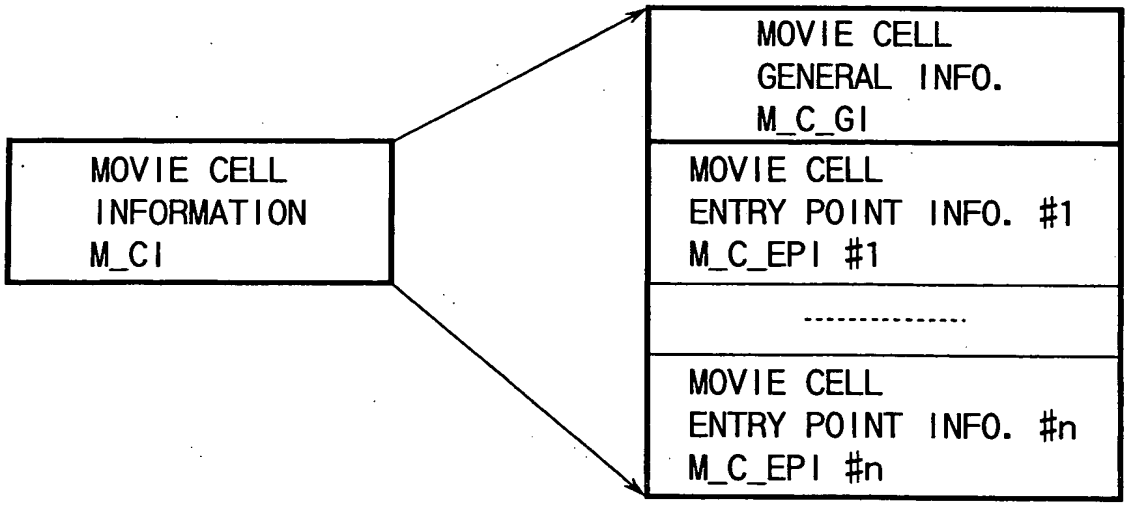
MOVIE CELL
INFORMATION
M_CI
MOVIE CELL
GENERAL INFO.
M_C_GI
MOVIE CELL
ENTRY POINT INFO. #1
M_C_EPI #1
MOVIE CELL
ENTRY POINT INFO. #n
M_C_EPI #n

FIG. 31

CONTENTS OF M_C_GI

| FIELD NAME | CONTENTS |
|---|---|
| RESERVED | RESERVED |
| C_TY | CELL TYPE |
| M_VOBI_SRPN | MOVIE VOBI SRP NUMBER |
| C_EPI_Ns | NUMBER OF CELL ENTRY POINT INFO. |
| C_V_S_PTM | PRESENTATION START TIME OF CELL |
| C_V_E_PTM | PRESENTATION END TIME OF CELL |

FIG. 32

CONTENTS OF M_C_EPI

| FIELD NAME | CONTENTS |
|---|---|
| EP_TY | ENTRY POINT TYPE |
| EP_PTM | PTM OF ENTRY POINT |
| PRM_TXTI | PRIMARY TEXT INFORMATION |

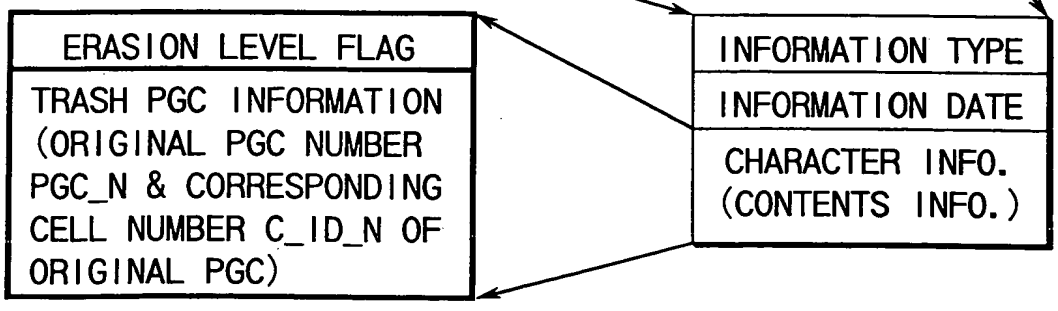


FIG. 33

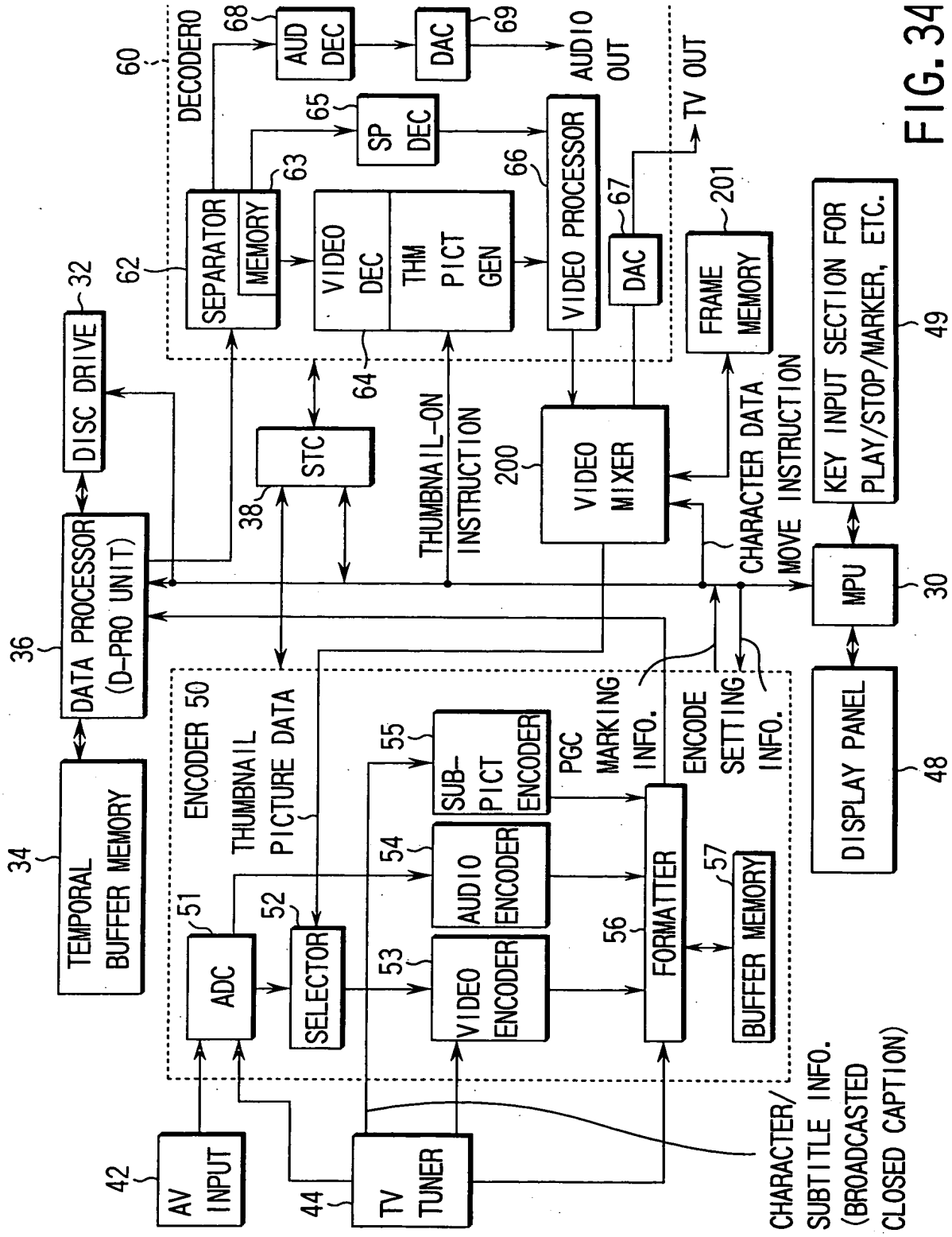
DECODER 60
AUD DEC 68
DAC 69
AUDIO OUT
SP DEC 65
VIDEO PROCESSOR 66
TV OUT
SEPARATOR 62
MEMORY 63
VIDEO DEC
THM PICT GEN 64
DAC 67
FRAME MEMORY 201
DISC DRIVE 32
STC 38
THUMBNAIL-ON INSTRUCTION
200
VIDEO MIXER
CHARACTER DATA MOVE INSTRUCTION
KEY INPUT SECTION FOR PLAY/STOP/MARKER, ETC. 49
DATA PROCESSOR (D-PRO UNIT) 36
MPU 30
ENCODER 50
THUMBNAIL PICTURE DATA
SUB-PICT ENCODER 55
PGC MARKING INFO.
ENCODE SETTING INFO.
TEMPORAL BUFFER MEMORY 34
ADC 51
SELECTOR 52
AUDIO ENCODER 54
VIDEO ENCODER 53
FORMATTER 56
BUFFER MEMORY 57
DISPLAY PANEL 48
AV INPUT 42
TV TUNER 44
CHARACTER/ SUBTITLE INFO. (BROADCASTED CLOSED CAPTION)

FIG. 34

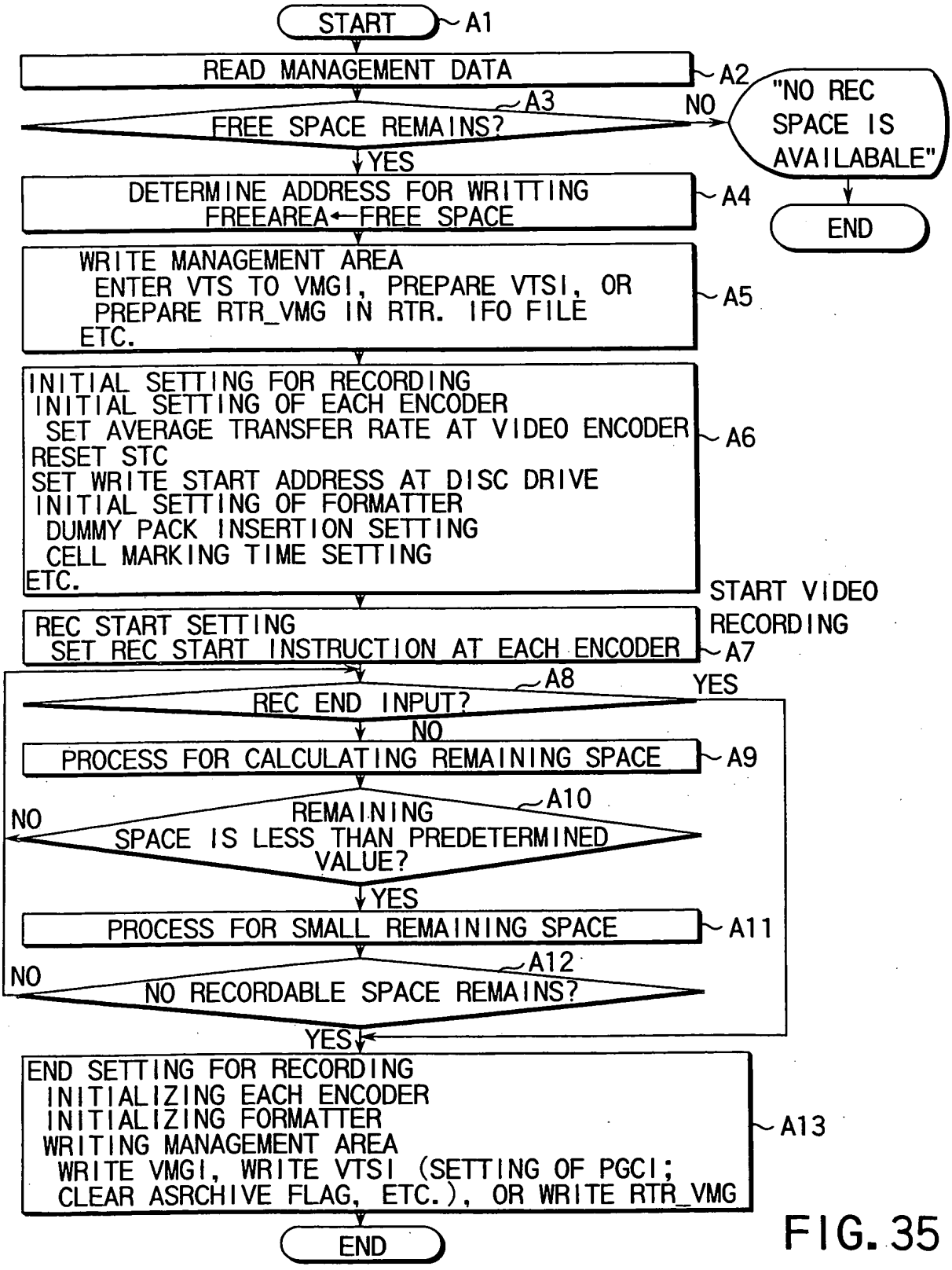
START
A1
READ MANAGEMENT DATA
A2
A3
FREE SPACE REMAINS?
NO
"NO REC SPACE IS AVAILABALE"
END
YES
DETERMINE ADDRESS FOR WRITTING
FREEAREA←FREE SPACE
A4
WRITE MANAGEMENT AREA
ENTER VTS TO VMGI, PREPARE VTSI, OR
PREPARE RTR_VMG IN RTR. IFO FILE
ETC.
A5
INITIAL SETTING FOR RECORDING
INITIAL SETTING OF EACH ENCODER
SET AVERAGE TRANSFER RATE AT VIDEO ENCODER
RESET STC
SET WRITE START ADDRESS AT DISC DRIVE
INITIAL SETTING OF FORMATTER
DUMMY PACK INSERTION SETTING
CELL MARKING TIME SETTING
ETC.
A6
START VIDEO RECORDING
REC START SETTING
SET REC START INSTRUCTION AT EACH ENCODER
A7
A8
REC END INPUT?
YES
NO
PROCESS FOR CALCULATING REMAINING SPACE
A9
A10
NO
REMAINING SPACE IS LESS THAN PREDETERMINED VALUE?
YES
PROCESS FOR SMALL REMAINING SPACE
A11
A12
NO
NO RECORDABLE SPACE REMAINS?
YES
END SETTING FOR RECORDING
INITIALIZING EACH ENCODER
INITIALIZING FORMATTER
WRITING MANAGEMENT AREA
WRITE VMGI, WRITE VTSI (SETTING OF PGCI;
CLEAR ASRCHIVE FLAG, ETC.), OR WRITE RTR_VMG
A13
END

FIG. 35

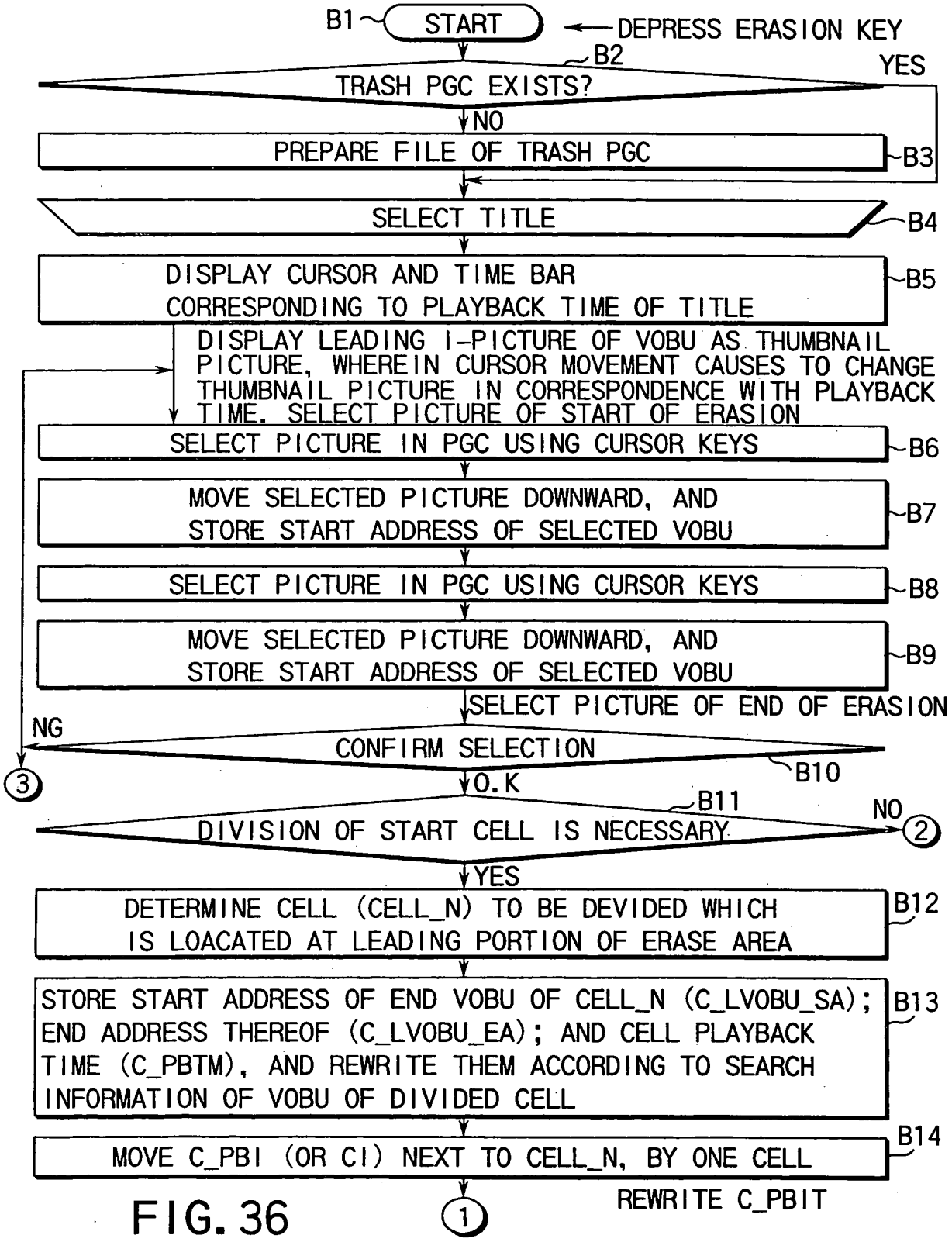
B1
START
DEPRESS ERASION KEY
B2
TRASH PGC EXISTS?
YES
NO
PREPARE FILE OF TRASH PGC
B3
SELECT TITLE
B4
DISPLAY CURSOR AND TIME BAR CORRESPONDING TO PLAYBACK TIME OF TITLE
B5
DISPLAY LEADING I-PICTURE OF VOBU AS THUMBNAIL PICTURE, WHEREIN CURSOR MOVEMENT CAUSES TO CHANGE THUMBNAIL PICTURE IN CORRESPONDENCE WITH PLAYBACK TIME. SELECT PICTURE OF START OF ERASION
SELECT PICTURE IN PGC USING CURSOR KEYS
B6
MOVE SELECTED PICTURE DOWNWARD, AND STORE START ADDRESS OF SELECTED VOBU
B7
SELECT PICTURE IN PGC USING CURSOR KEYS
B8
MOVE SELECTED PICTURE DOWNWARD, AND STORE START ADDRESS OF SELECTED VOBU
B9
SELECT PICTURE OF END OF ERASION
NG
CONFIRM SELECTION
B10
3
O.K
B11
DIVISION OF START CELL IS NECESSARY
NO
2
YES
DETERMINE CELL (CELL_N) TO BE DEVIDED WHICH IS LOACATED AT LEADING PORTION OF ERASE AREA
B12
STORE START ADDRESS OF END VOBU OF CELL_N (C_LVOBU_SA); END ADDRESS THEREOF (C_LVOBU_EA); AND CELL PLAYBACK TIME (C_PBTM), AND REWRITE THEM ACCORDING TO SEARCH INFORMATION OF VOBU OF DIVIDED CELL
B13
MOVE C_PBI (OR CI) NEXT TO CELL_N, BY ONE CELL
B14
REWRITE C_PBIT
1

FIG. 36

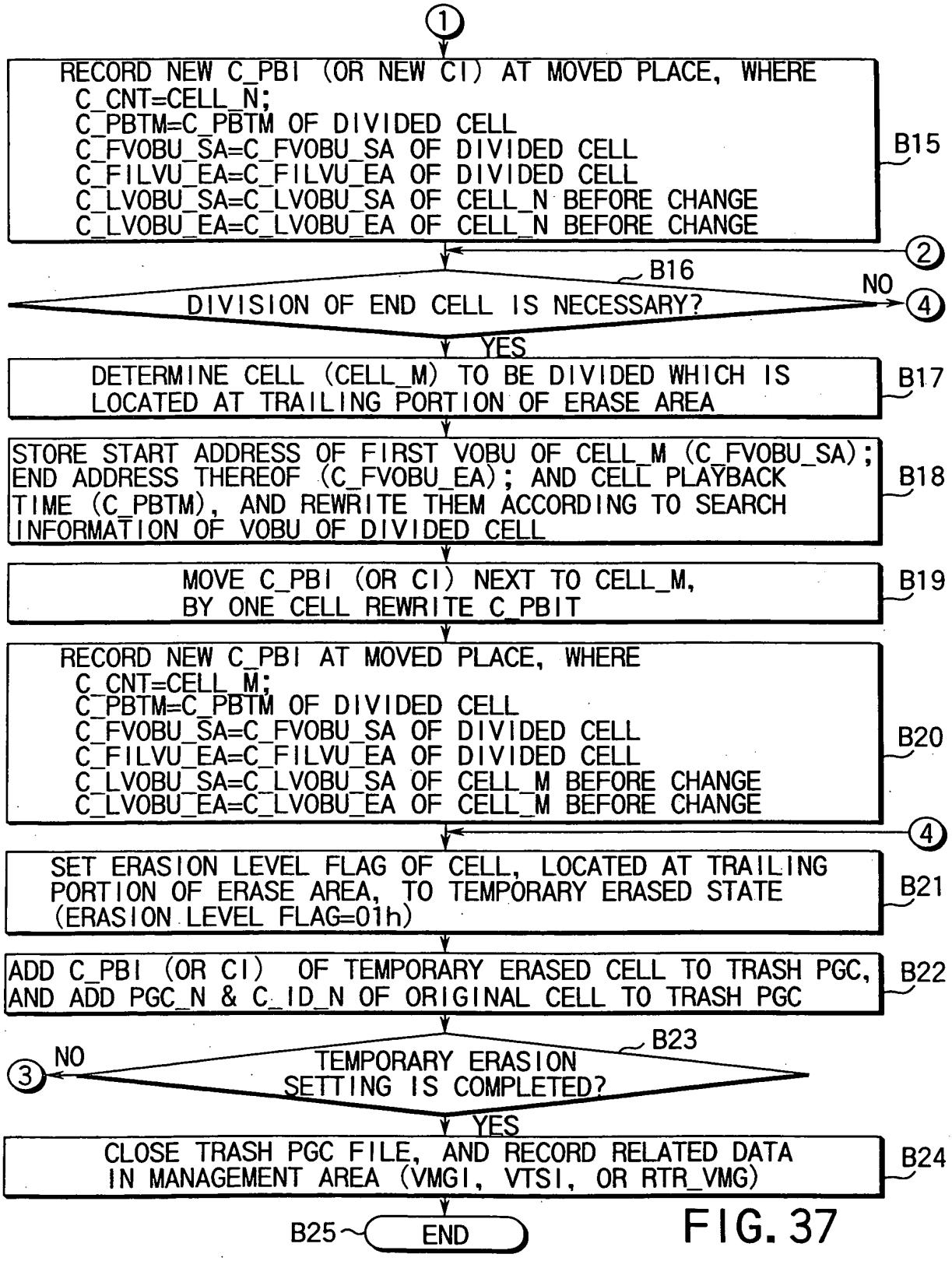
1
RECORD NEW C_PBI (OR NEW CI) AT MOVED PLACE, WHERE
C_CNT=CELL_N;
C_PBTM=C_PBTM OF DIVIDED CELL
C_FVOBU_SA=C_FVOBU_SA OF DIVIDED CELL
C_FILVU_EA=C_FILVU_EA OF DIVIDED CELL
C_LVOBU_SA=C_LVOBU_SA OF CELL_N BEFORE CHANGE
C_LVOBU_EA=C_LVOBU_EA OF CELL_N BEFORE CHANGE
B15
2
B16
DIVISION OF END CELL IS NECESSARY?
NO
4
YES
DETERMINE CELL (CELL_M) TO BE DIVIDED WHICH IS LOCATED AT TRAILING PORTION OF ERASE AREA
B17
STORE START ADDRESS OF FIRST VOBU OF CELL_M (C_FVOBU_SA); END ADDRESS THEREOF (C_FVOBU_EA); AND CELL PLAYBACK TIME (C_PBTM), AND REWRITE THEM ACCORDING TO SEARCH INFORMATION OF VOBU OF DIVIDED CELL
B18
MOVE C_PBI (OR CI) NEXT TO CELL_M, BY ONE CELL REWRITE C_PBIT
B19
RECORD NEW C_PBI AT MOVED PLACE, WHERE
C_CNT=CELL_M;
C_PBTM=C_PBTM OF DIVIDED CELL
C_FVOBU_SA=C_FVOBU_SA OF DIVIDED CELL
C_FILVU_EA=C_FILVU_EA OF DIVIDED CELL
C_LVOBU_SA=C_LVOBU_SA OF CELL_M BEFORE CHANGE
C_LVOBU_EA=C_LVOBU_EA OF CELL_M BEFORE CHANGE
B20
4
SET ERASION LEVEL FLAG OF CELL, LOCATED AT TRAILING PORTION OF ERASE AREA, TO TEMPORARY ERASED STATE (ERASION LEVEL FLAG=01h)
B21
ADD C_PBI (OR CI) OF TEMPORARY ERASED CELL TO TRASH PGC, AND ADD PGC_N & C_ID_N OF ORIGINAL CELL TO TRASH PGC
B22
B23
3
NO
TEMPORARY ERASION SETTING IS COMPLETED?
YES
CLOSE TRASH PGC FILE, AND RECORD RELATED DATA IN MANAGEMENT AREA (VMGI, VTSI, OR RTR_VMG)
B24
B25
END

FIG. 37

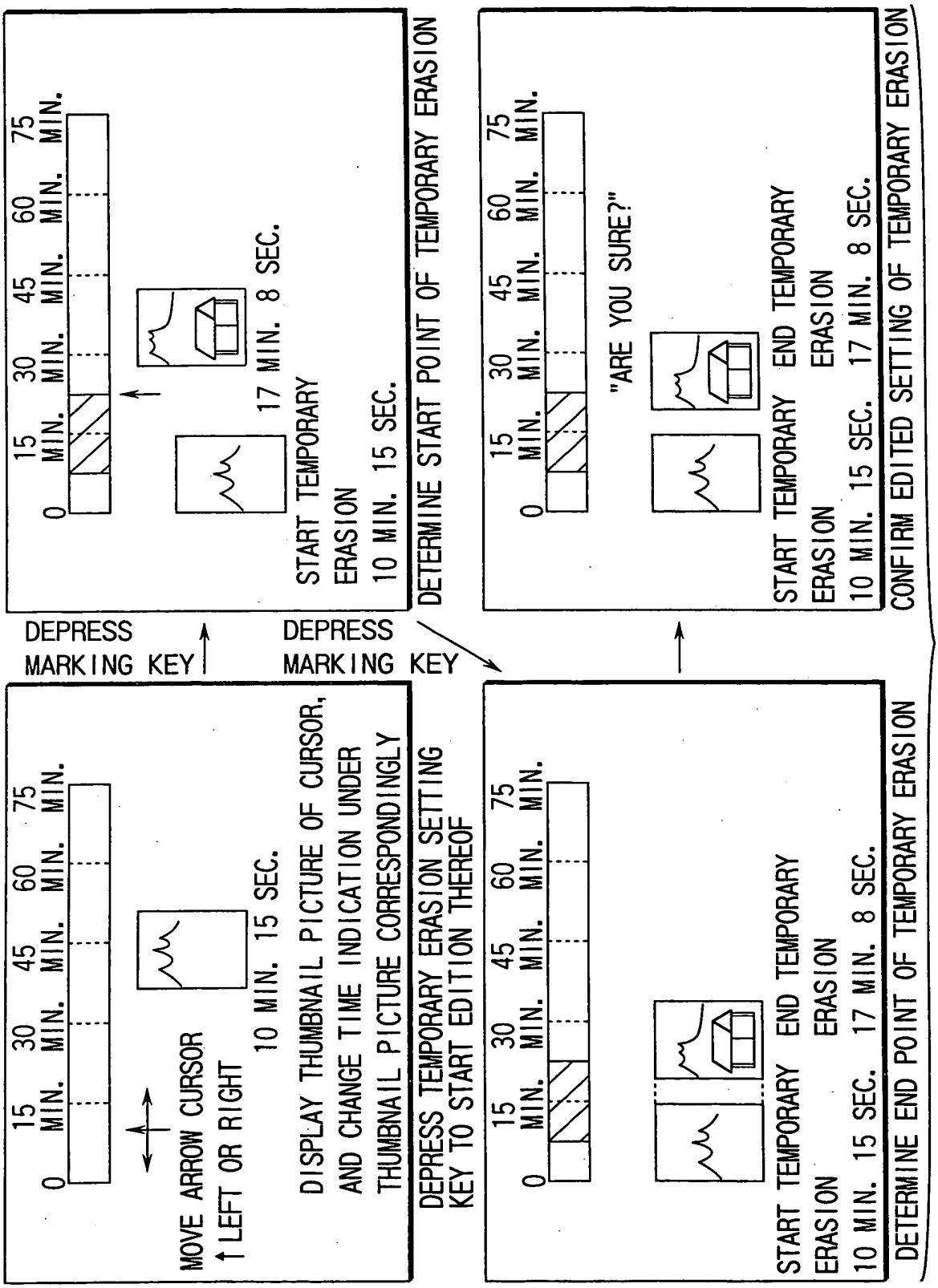
0 15 MIN. 30 MIN. 45 MIN. 60 MIN. 75 MIN.
MOVE ARROW CURSOR
↑ LEFT OR RIGHT
10 MIN. 15 SEC.
DISPLAY THUMBNAIL PICTURE OF CURSOR, AND CHANGE TIME INDICATION UNDER THUMBNAIL PICTURE CORRESPONDINGLY
DEPRESS TEMPORARY ERASION SETTING KEY TO START EDITION THEREOF
DEPRESS MARKING KEY
START TEMPORARY ERASION
10 MIN. 15 SEC. 17 MIN. 8 SEC.
DETERMINE END POINT OF TEMPORARY ERASION
DEPRESS MARKING KEY
START TEMPORARY ERASION
10 MIN. 15 SEC. 17 MIN. 8 SEC.
DETERMINE START POINT OF TEMPORARY ERASION
"ARE YOU SURE?"
START TEMPORARY ERASION
END TEMPORARY ERASION
10 MIN. 15 SEC. 17 MIN. 8 SEC.
CONFIRM EDITED SETTING OF TEMPORARY ERASION

FIG. 38

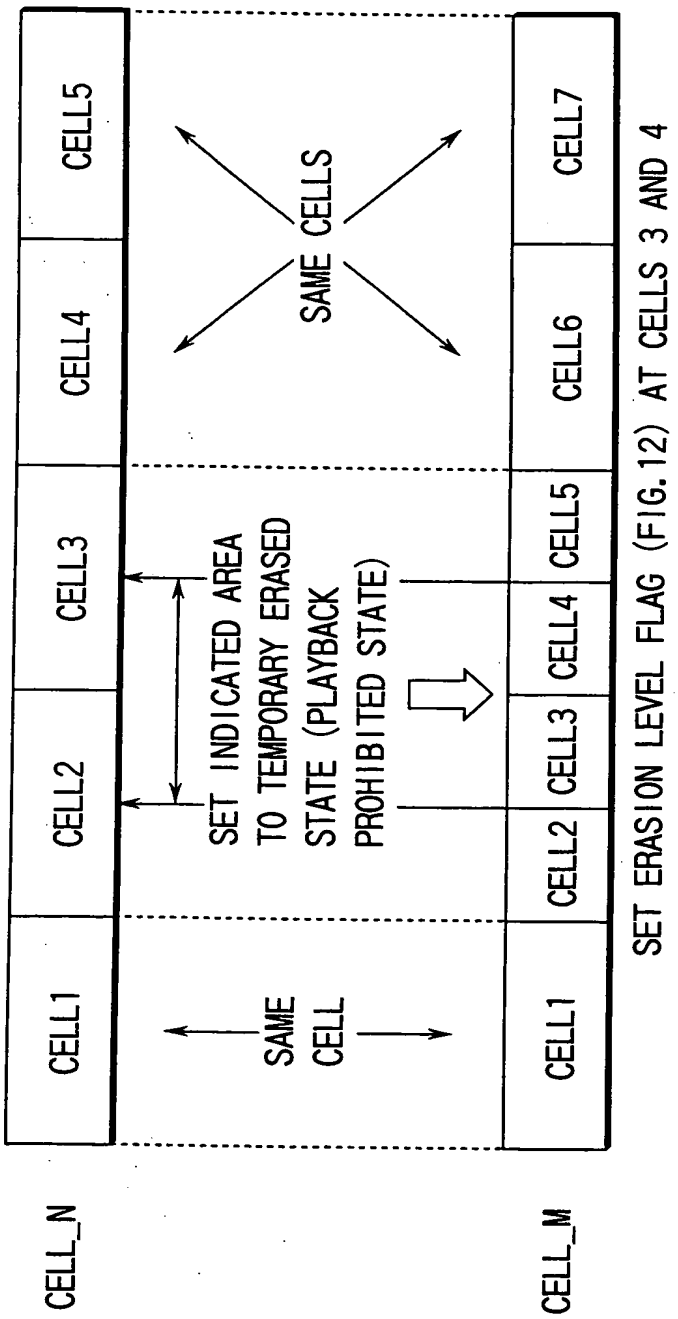
CELL_N
CELL1
CELL2
CELL3
CELL4
CELL5
SAME CELL
SET INDICATED AREA TO TEMPORARY ERASED STATE (PLAYBACK PROHIBITED STATE)
SAME CELLS
CELL_M
CELL1
CELL2
CELL3
CELL4
CELL5
CELL6
CELL7
SET ERASION LEVEL FLAG (FIG.12) AT CELLS 3 AND 4

FIG. 39

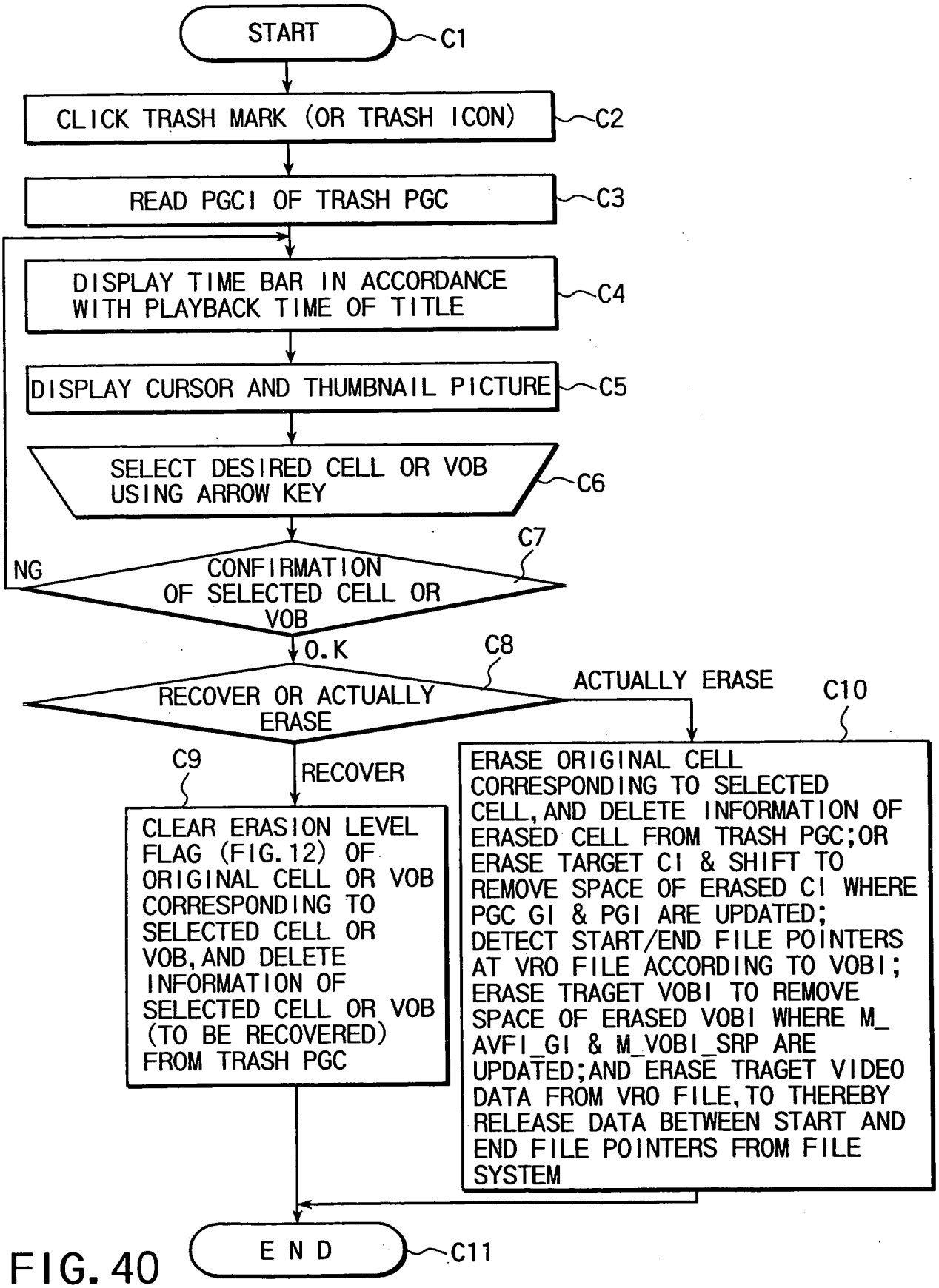
START
C1
CLICK TRASH MARK (OR TRASH ICON)
C2
READ PGCI OF TRASH PGC
C3
DISPLAY TIME BAR IN ACCORDANCE WITH PLAYBACK TIME OF TITLE
C4
DISPLAY CURSOR AND THUMBNAIL PICTURE
C5
SELECT DESIRED CELL OR VOB USING ARROW KEY
C6
C7
NG
CONFIRMATION OF SELECTED CELL OR VOB
O.K
C8
RECOVER OR ACTUALLY ERASE
ACTUALLY ERASE
C10
C9
RECOVER
CLEAR ERASION LEVEL FLAG (FIG.12) OF ORIGINAL CELL OR VOB CORRESPONDING TO SELECTED CELL OR VOB, AND DELETE INFORMATION OF SELECTED CELL OR VOB (TO BE RECOVERED) FROM TRASH PGC
ERASE ORIGINAL CELL CORRESPONDING TO SELECTED CELL, AND DELETE INFORMATION OF ERASED CELL FROM TRASH PGC; OR ERASE TARGET CI & SHIFT TO REMOVE SPACE OF ERASED CI WHERE PGC GI & PGI ARE UPDATED; DETECT START/END FILE POINTERS AT VRO FILE ACCORDING TO VOBI; ERASE TRAGET VOBI TO REMOVE SPACE OF ERASED VOBI WHERE M_AVFI_GI & M_VOBI_SRP ARE UPDATED; AND ERASE TRAGET VIDEO DATA FROM VRO FILE, TO THEREBY RELEASE DATA BETWEEN START AND END FILE POINTERS FROM FILE SYSTEM
END
C11

FIG. 40

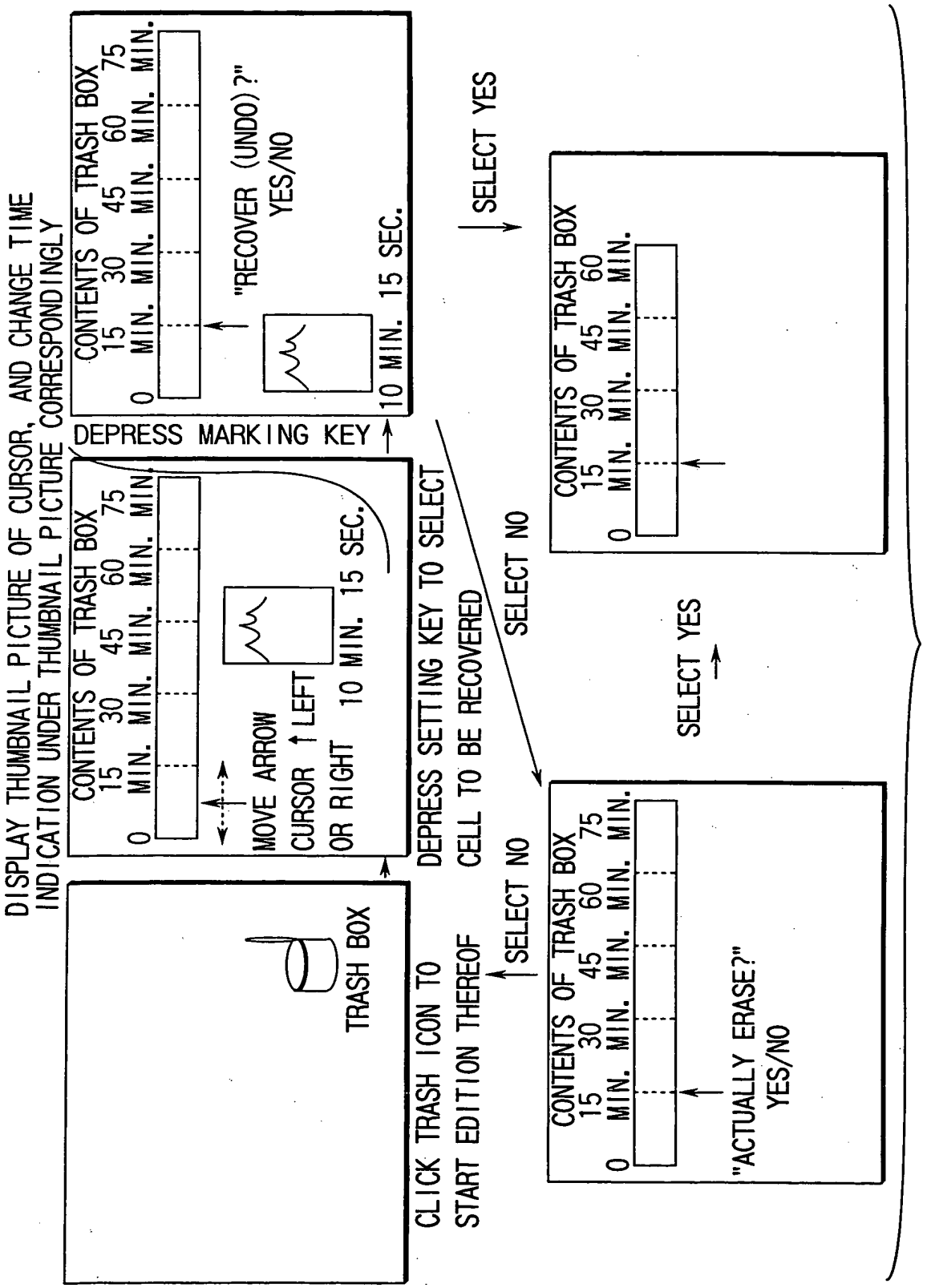
DISPLAY THUMBNAIL PICTURE OF CURSOR, AND CHANGE TIME INDICATION UNDER THUMBNAIL PICTURE CORRESPONDINGLY
TRASH BOX
CLICK TRASH ICON TO START EDITION THEREOF
SELECT NO
CONTENTS OF TRASH BOX
0 15 30 45 60 75
MIN. MIN. MIN. MIN. MIN. MIN.
MOVE ARROW CURSOR ↑ LEFT OR RIGHT
10 MIN. 15 SEC.
DEPRESS SETTING KEY TO SELECT CELL TO BE RECOVERED
SELECT NO
DEPRESS MARKING KEY
"RECOVER (UNDO)?" YES/NO
10 MIN. 15 SEC.
SELECT YES
CONTENTS OF TRASH BOX
0 15 30 45 60
MIN. MIN. MIN. MIN. MIN.
SELECT YES
CONTENTS OF TRASH BOX
0 15 30 45 60 75
MIN. MIN. MIN. MIN. MIN. MIN.
"ACTUALLY ERASE?" YES/NO

FIG. 41

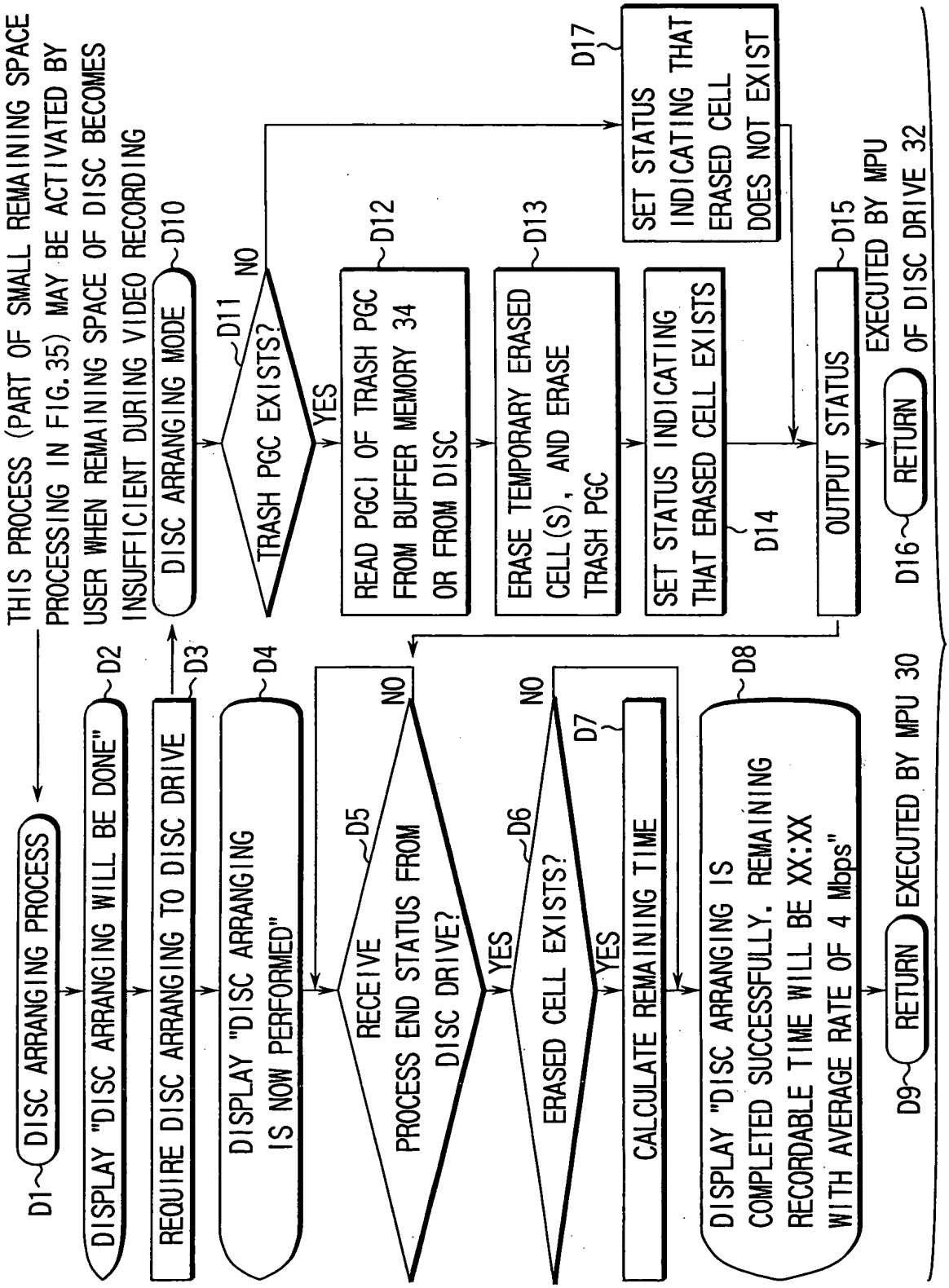
THIS PROCESS (PART OF SMALL REMAINING SPACE PROCESSING IN FIG. 35) MAY BE ACTIVATED BY USER WHEN REMAINING SPACE OF DISC BECOMES INSUFFICIENT DURING VIDEO RECORDING
D1
DISC ARRANGING PROCESS
D2
DISPLAY "DISC ARRANGING WILL BE DONE"
D3
REQUIRE DISC ARRANGING TO DISC DRIVE
D4
DISPLAY "DISC ARRANGING IS NOW PERFORMED"
D5
RECEIVE PROCESS END STATUS FROM DISC DRIVE?
NO
YES
D6
ERASED CELL EXISTS?
NO
YES
D7
CALCULATE REMAINING TIME
D8
DISPLAY "DISC ARRANGING IS COMPLETED SUCCESFULLY. REMAINING RECORDABLE TIME WILL BE XX:XX WITH AVERAGE RATE OF 4 Mbps"
D9
RETURN
EXECUTED BY MPU 30
D10
DISC ARRANGING MODE
D11
TRASH PGC EXISTS?
NO
YES
D12
READ PGCI OF TRASH PGC FROM BUFFER MEMORY 34 OR FROM DISC
D13
ERASE TEMPORARY ERASED CELL(S), AND ERASE TRASH PGC
D14
SET STATUS INDICATING THAT ERASED CELL EXISTS
D15
OUTPUT STATUS
D16
RETURN
EXECUTED BY MPU OF DISC DRIVE 32
D17
SET STATUS INDICATING THAT ERASED CELL DOES NOT EXIST

FIG. 42

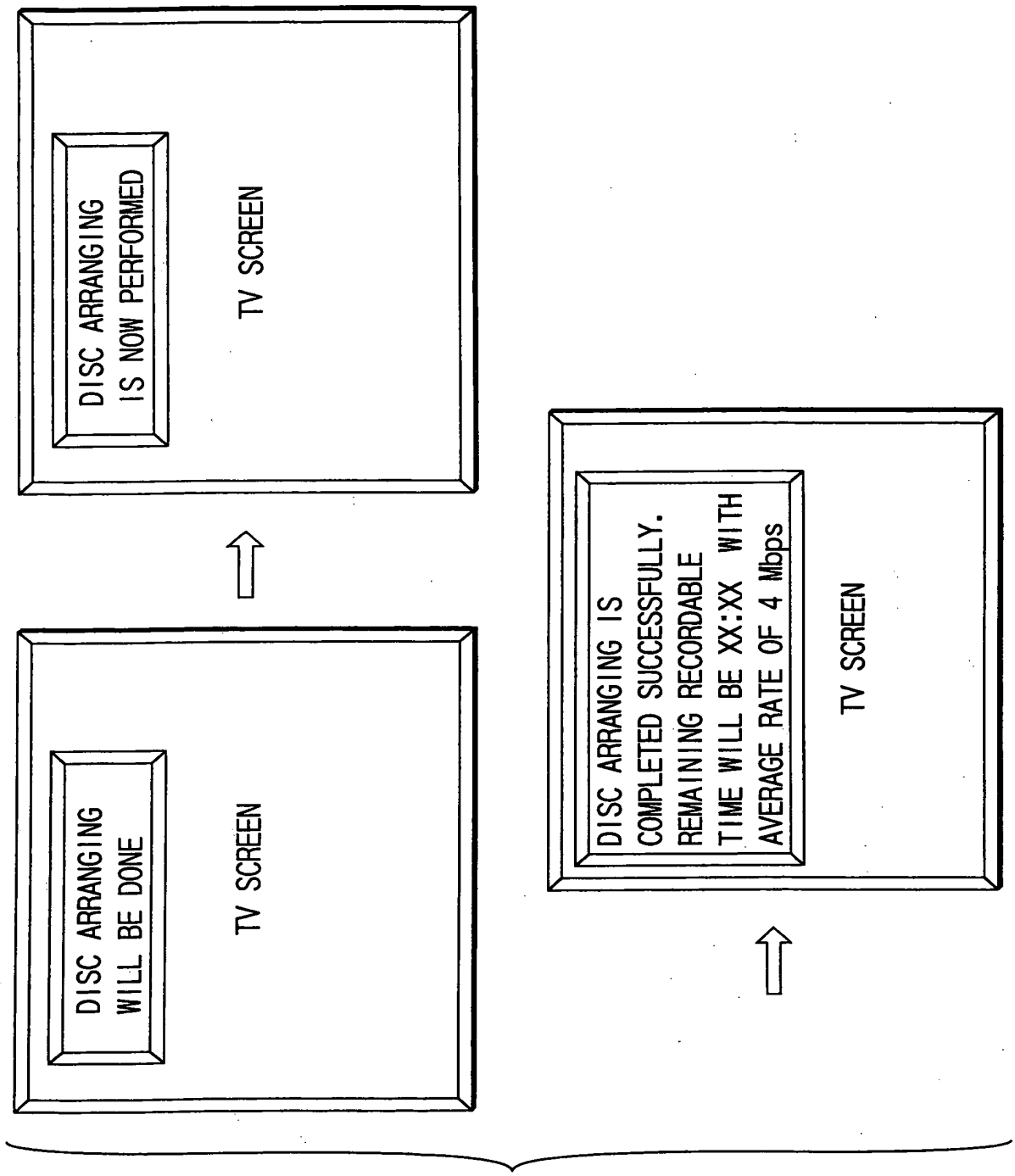
DISC ARRANGING WILL BE DONE
TV SCREEN
DISC ARRANGING IS NOW PERFORMED
TV SCREEN
DISC ARRANGING IS COMPLETED SUCCESSFULLY.
REMAINING RECORDABLE TIME WILL BE XX:XX WITH AVERAGE RATE OF 4 Mbps
TV SCREEN

FIG. 43

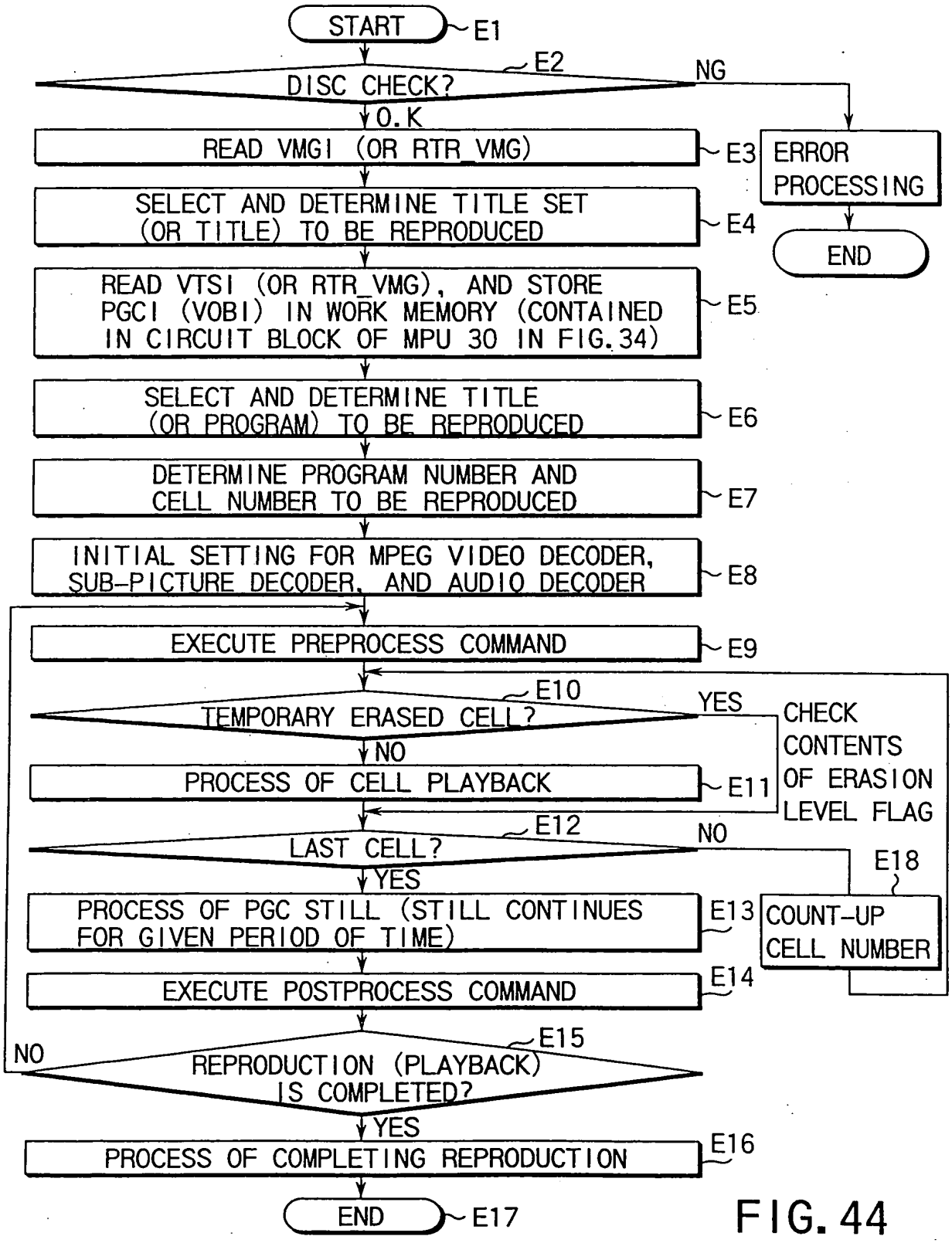
START
E1
DISC CHECK?
E2
NG
O.K
READ VMGI (OR RTR_VMG)
E3
ERROR PROCESSING
END
SELECT AND DETERMINE TITLE SET (OR TITLE) TO BE REPRODUCED
E4
READ VTSI (OR RTR_VMG), AND STORE PGCI (VOBI) IN WORK MEMORY (CONTAINED IN CIRCUIT BLOCK OF MPU 30 IN FIG. 34)
E5
SELECT AND DETERMINE TITLE (OR PROGRAM) TO BE REPRODUCED
E6
DETERMINE PROGRAM NUMBER AND CELL NUMBER TO BE REPRODUCED
E7
INITIAL SETTING FOR MPEG VIDEO DECODER, SUB-PICTURE DECODER, AND AUDIO DECODER
E8
EXECUTE PREPROCESS COMMAND
E9
TEMPORARY ERASED CELL?
E10
YES
CHECK CONTENTS OF ERASION LEVEL FLAG
NO
PROCESS OF CELL PLAYBACK
E11
LAST CELL?
E12
NO
E18
YES
PROCESS OF PGC STILL (STILL CONTINUES FOR GIVEN PERIOD OF TIME)
E13
COUNT-UP CELL NUMBER
EXECUTE POSTPROCESS COMMAND
E14
NO
REPRODUCTION (PLAYBACK) IS COMPLETED?
E15
YES
PROCESS OF COMPLETING REPRODUCTION
E16
END
E17

FIG. 44

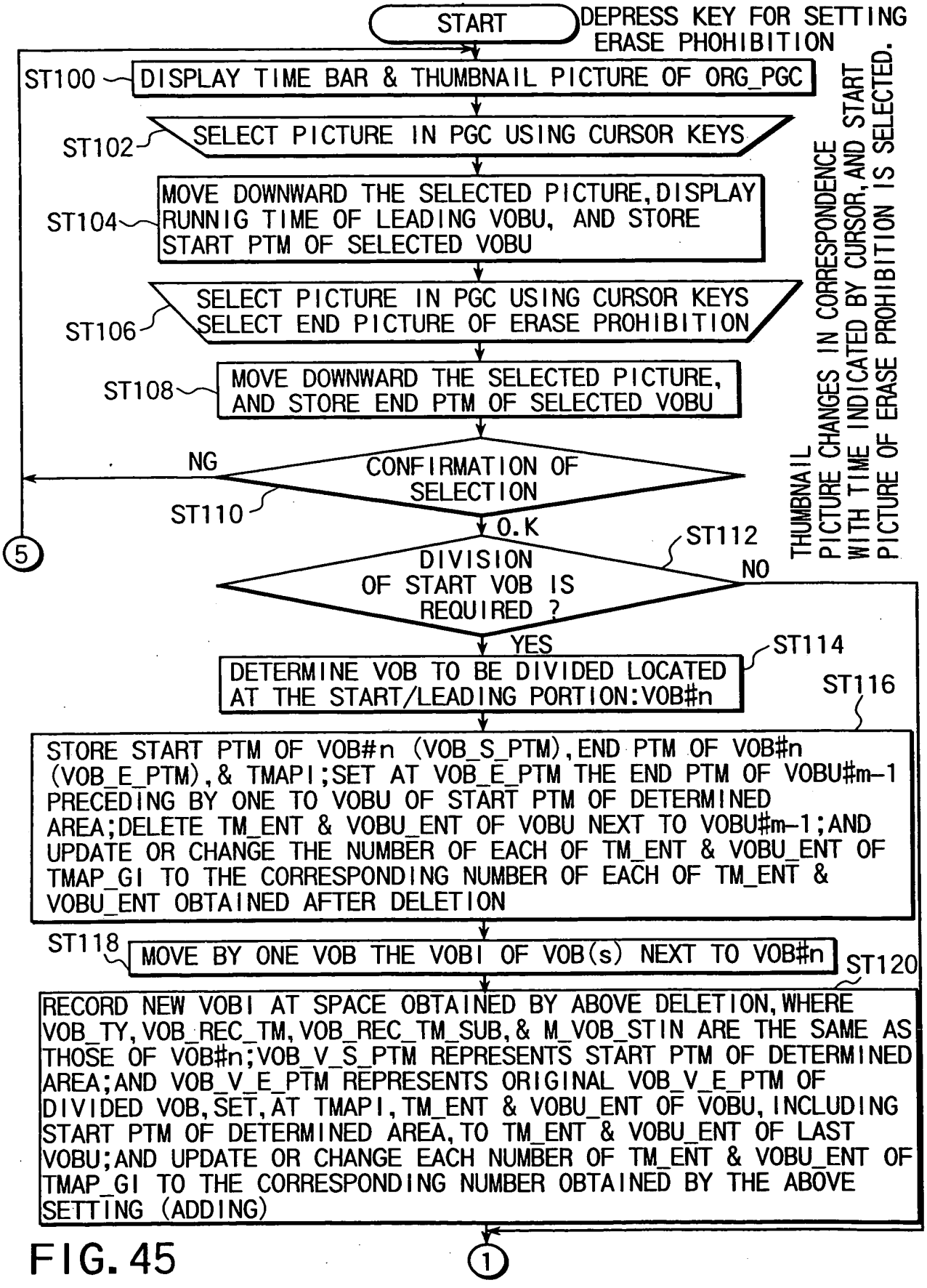
START
DEPRESS KEY FOR SETTING ERASE PHOHIBITION
ST100
DISPLAY TIME BAR & THUMBNAIL PICTURE OF ORG_PGC
ST102
SELECT PICTURE IN PGC USING CURSOR KEYS
ST104
MOVE DOWNWARD THE SELECTED PICTURE, DISPLAY RUNNIG TIME OF LEADING VOBU, AND STORE START PTM OF SELECTED VOBU
ST106
SELECT PICTURE IN PGC USING CURSOR KEYS SELECT END PICTURE OF ERASE PROHIBITION
ST108
MOVE DOWNWARD THE SELECTED PICTURE, AND STORE END PTM OF SELECTED VOBU
ST110
CONFIRMATION OF SELECTION
NG
O.K
5
ST112
DIVISION OF START VOB IS REQUIRED ?
NO
YES
ST114
DETERMINE VOB TO BE DIVIDED LOCATED AT THE START/LEADING PORTION:VOB#n
ST116
STORE START PTM OF VOB#n (VOB_S_PTM), END PTM OF VOB#n (VOB_E_PTM), & TMAPI;SET AT VOB_E_PTM THE END PTM OF VOBU#m-1 PRECEDING BY ONE TO VOBU OF START PTM OF DETERMINED AREA;DELETE TM_ENT & VOBU_ENT OF VOBU NEXT TO VOBU#m-1;AND UPDATE OR CHANGE THE NUMBER OF EACH OF TM_ENT & VOBU_ENT OF TMAP_GI TO THE CORRESPONDING NUMBER OF EACH OF TM_ENT & VOBU_ENT OBTAINED AFTER DELETION
ST118
MOVE BY ONE VOB THE VOBI OF VOB(s) NEXT TO VOB#n
ST120
RECORD NEW VOBI AT SPACE OBTAINED BY ABOVE DELETION, WHERE VOB_TY, VOB_REC_TM, VOB_REC_TM_SUB, & M_VOB_STIN ARE THE SAME AS THOSE OF VOB#n;VOB_V_S_PTM REPRESENTS START PTM OF DETERMINED AREA;AND VOB_V_E_PTM REPRESENTS ORIGINAL VOB_V_E_PTM OF DIVIDED VOB, SET, AT TMAPI, TM_ENT & VOBU_ENT OF VOBU, INCLUDING START PTM OF DETERMINED AREA, TO TM_ENT & VOBU_ENT OF LAST VOBU;AND UPDATE OR CHANGE EACH NUMBER OF TM_ENT & VOBU_ENT OF TMAP_GI TO THE CORRESPONDING NUMBER OBTAINED BY THE ABOVE SETTING (ADDING)
1
THUMBNAIL PICTURE CHANGES IN CORRESPONDENCE WITH TIME INDICATED BY CURSOR, AND START PICTURE OF ERASE PROHIBITION IS SELECTED.

FIG. 45

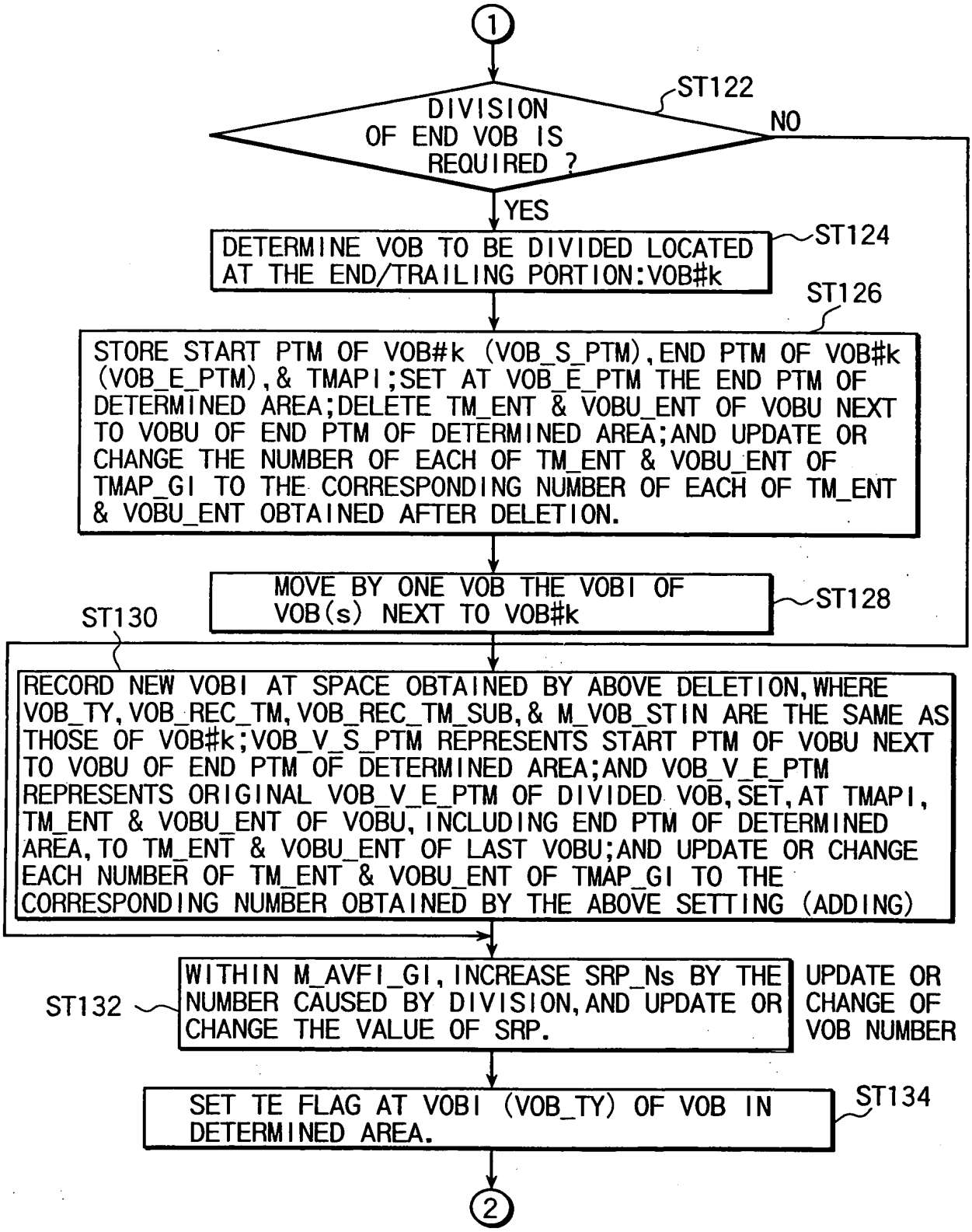
1
DIVISION OF END VOB IS REQUIRED ?
ST122
NO
YES
DETERMINE VOB TO BE DIVIDED LOCATED AT THE END/TRAILING PORTION:VOB#k
ST124
ST126
STORE START PTM OF VOB#k (VOB_S_PTM), END PTM OF VOB#k (VOB_E_PTM), & TMAPI;SET AT VOB_E_PTM THE END PTM OF DETERMINED AREA;DELETE TM_ENT & VOBU_ENT OF VOBU NEXT TO VOBU OF END PTM OF DETERMINED AREA;AND UPDATE OR CHANGE THE NUMBER OF EACH OF TM_ENT & VOBU_ENT OF TMAP_GI TO THE CORRESPONDING NUMBER OF EACH OF TM_ENT & VOBU_ENT OBTAINED AFTER DELETION.
MOVE BY ONE VOB THE VOBI OF VOB(s) NEXT TO VOB#k
ST128
ST130
RECORD NEW VOBI AT SPACE OBTAINED BY ABOVE DELETION, WHERE VOB_TY, VOB_REC_TM, VOB_REC_TM_SUB, & M_VOB_STIN ARE THE SAME AS THOSE OF VOB#k;VOB_V_S_PTM REPRESENTS START PTM OF VOBU NEXT TO VOBU OF END PTM OF DETERMINED AREA;AND VOB_V_E_PTM REPRESENTS ORIGINAL VOB_V_E_PTM OF DIVIDED VOB, SET, AT TMAPI, TM_ENT & VOBU_ENT OF VOBU, INCLUDING END PTM OF DETERMINED AREA, TO TM_ENT & VOBU_ENT OF LAST VOBU;AND UPDATE OR CHANGE EACH NUMBER OF TM_ENT & VOBU_ENT OF TMAP_GI TO THE CORRESPONDING NUMBER OBTAINED BY THE ABOVE SETTING (ADDING)
ST132
WITHIN M_AVFI_GI, INCREASE SRP_Ns BY THE NUMBER CAUSED BY DIVISION, AND UPDATE OR CHANGE THE VALUE OF SRP.
UPDATE OR CHANGE OF VOB NUMBER
SET TE FLAG AT VOBI (VOB_TY) OF VOB IN DETERMINED AREA.
ST134
2

FIG. 46

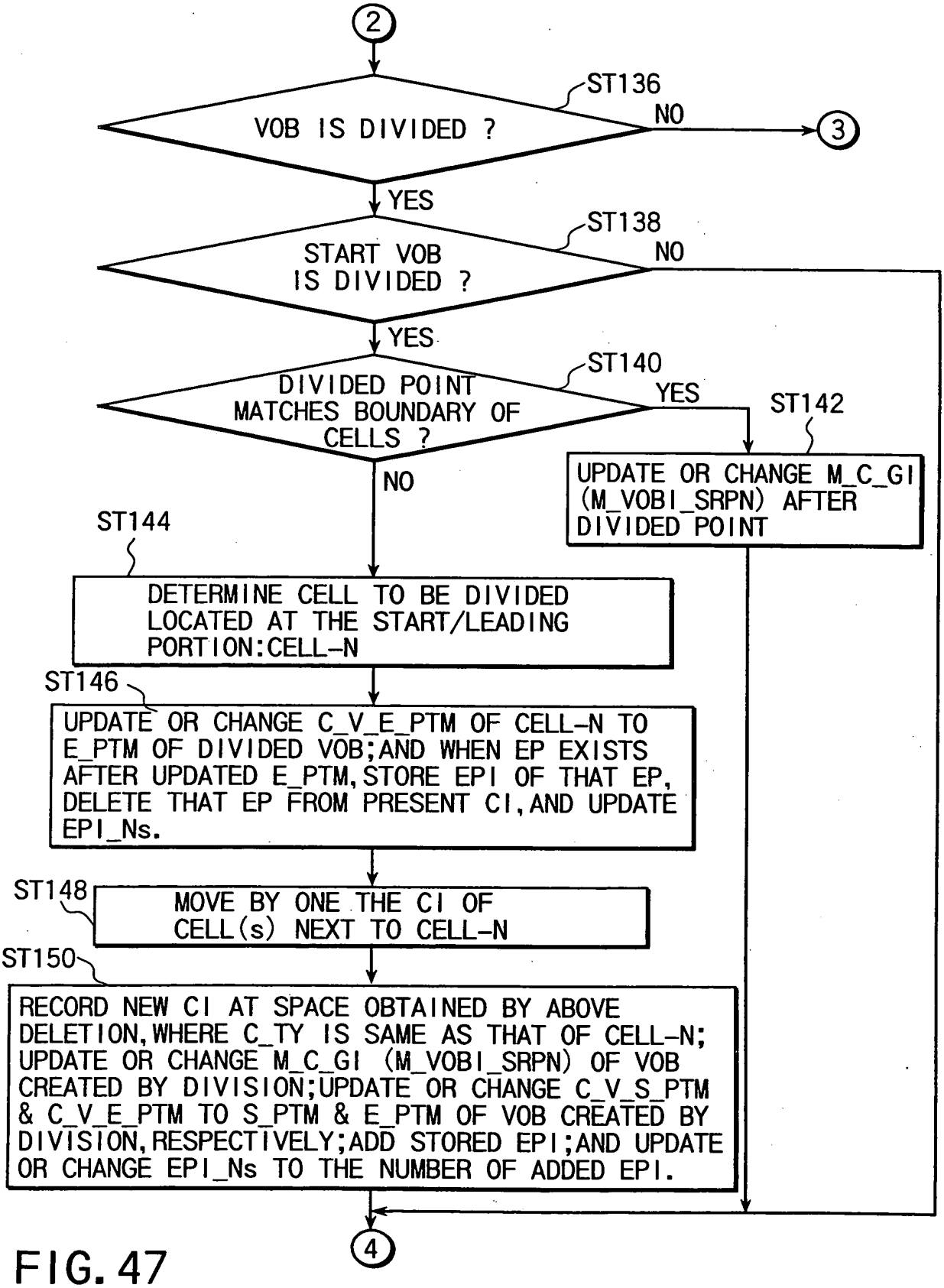
2
ST136
VOB IS DIVIDED ?
NO
3
YES
ST138
START VOB IS DIVIDED ?
NO
YES
ST140
DIVIDED POINT MATCHES BOUNDARY OF CELLS ?
YES
ST142
UPDATE OR CHANGE M_C_GI (M_VOBI_SRPN) AFTER DIVIDED POINT
NO
ST144
DETERMINE CELL TO BE DIVIDED LOCATED AT THE START/LEADING PORTION:CELL-N
ST146
UPDATE OR CHANGE C_V_E_PTM OF CELL-N TO E_PTM OF DIVIDED VOB;AND WHEN EP EXISTS AFTER UPDATED E_PTM, STORE EPI OF THAT EP, DELETE THAT EP FROM PRESENT CI, AND UPDATE EPI_Ns.
ST148
MOVE BY ONE THE CI OF CELL(s) NEXT TO CELL-N
ST150
RECORD NEW CI AT SPACE OBTAINED BY ABOVE DELETION, WHERE C_TY IS SAME AS THAT OF CELL-N; UPDATE OR CHANGE M_C_GI (M_VOBI_SRPN) OF VOB CREATED BY DIVISION;UPDATE OR CHANGE C_V_S_PTM & C_V_E_PTM TO S_PTM & E_PTM OF VOB CREATED BY DIVISION, RESPECTIVELY;ADD STORED EPI;AND UPDATE OR CHANGE EPI_Ns TO THE NUMBER OF ADDED EPI.
4

FIG. 47

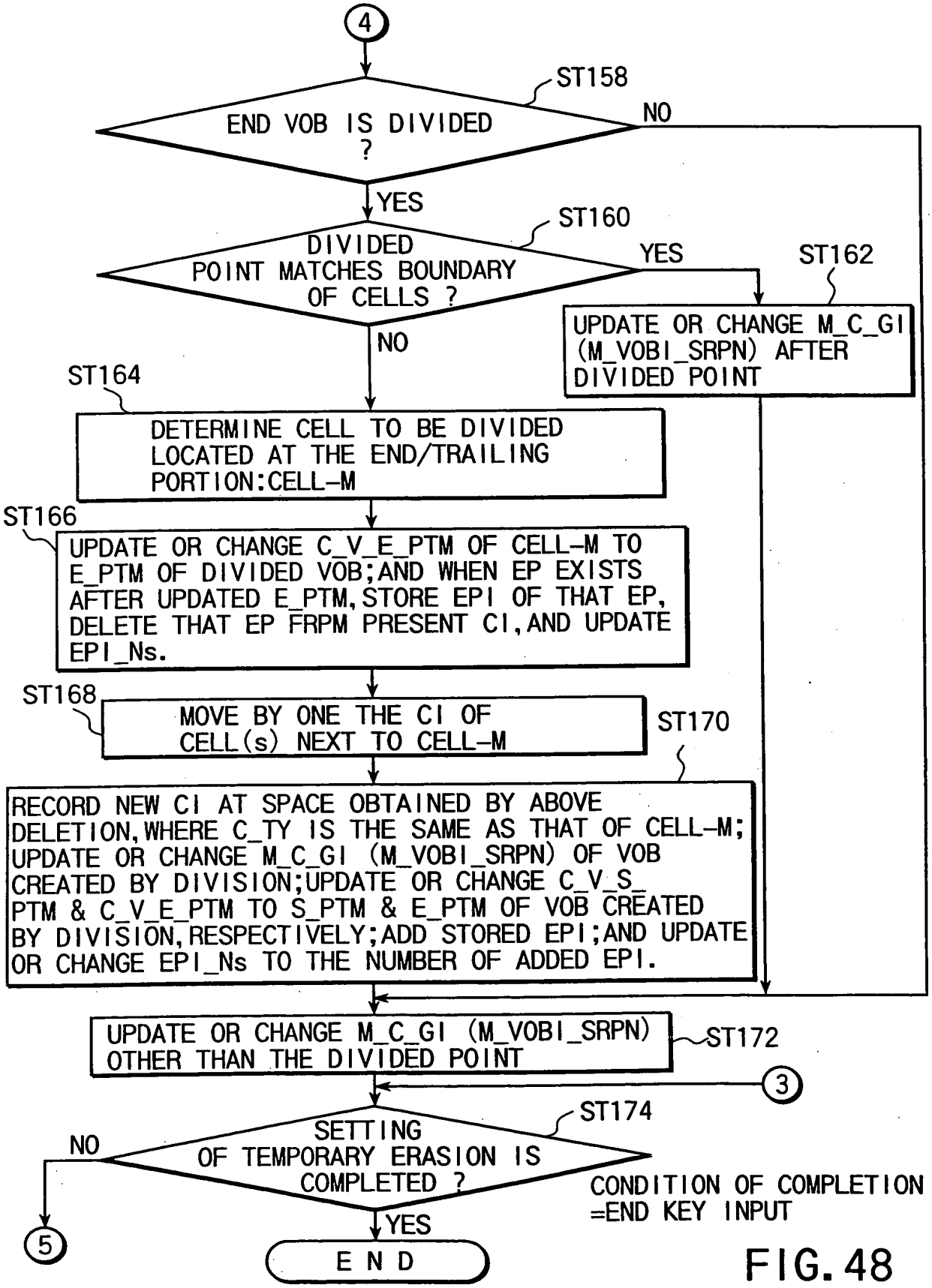
4
ST158
END VOB IS DIVIDED ?
NO
YES
ST160
DIVIDED POINT MATCHES BOUNDARY OF CELLS ?
YES
ST162
UPDATE OR CHANGE M_C_GI (M_VOBI_SRPN) AFTER DIVIDED POINT
NO
ST164
DETERMINE CELL TO BE DIVIDED LOCATED AT THE END/TRAILING PORTION:CELL-M
ST166
UPDATE OR CHANGE C_V_E_PTM OF CELL-M TO E_PTM OF DIVIDED VOB;AND WHEN EP EXISTS AFTER UPDATED E_PTM, STORE EPI OF THAT EP, DELETE THAT EP FRPM PRESENT CI, AND UPDATE EPI_Ns.
ST168
MOVE BY ONE THE CI OF CELL(s) NEXT TO CELL-M
ST170
RECORD NEW CI AT SPACE OBTAINED BY ABOVE DELETION, WHERE C_TY IS THE SAME AS THAT OF CELL-M; UPDATE OR CHANGE M_C_GI (M_VOBI_SRPN) OF VOB CREATED BY DIVISION;UPDATE OR CHANGE C_V_S_ PTM & C_V_E_PTM TO S_PTM & E_PTM OF VOB CREATED BY DIVISION, RESPECTIVELY;ADD STORED EPI;AND UPDATE OR CHANGE EPI_Ns TO THE NUMBER OF ADDED EPI.
UPDATE OR CHANGE M_C_GI (M_VOBI_SRPN) OTHER THAN THE DIVIDED POINT
ST172
3
ST174
NO
SETTING OF TEMPORARY ERASION IS COMPLETED ?
CONDITION OF COMPLETION =END KEY INPUT
YES
5
E N D

FIG. 48

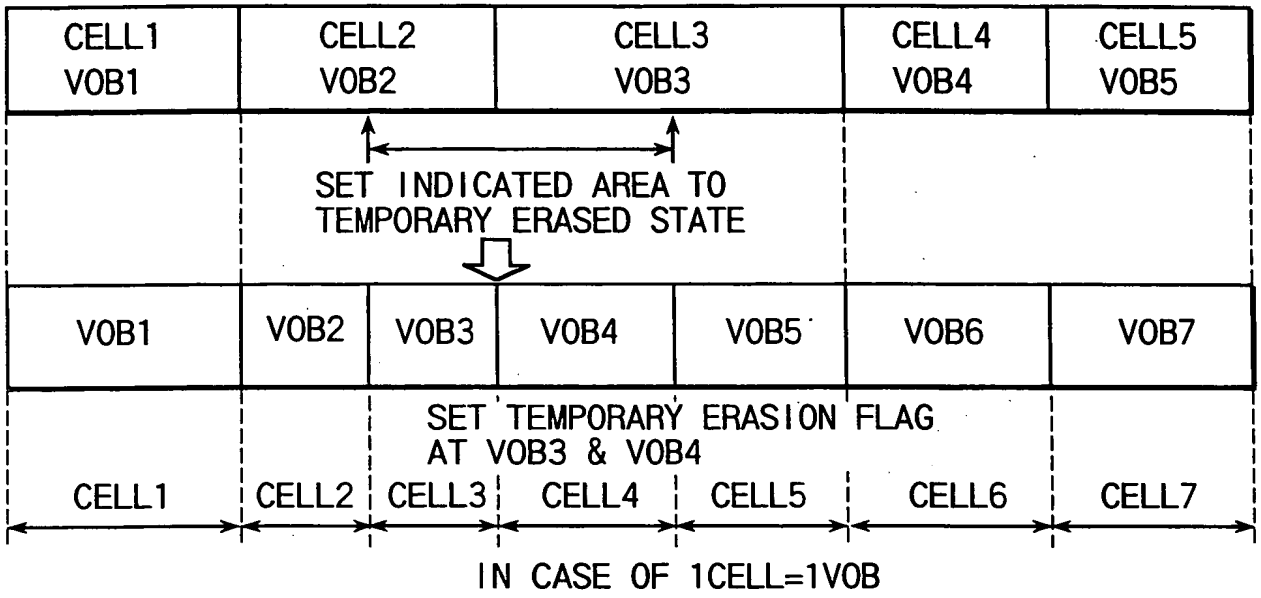
CELL1
VOB1
CELL2
VOB2
CELL3
VOB3
CELL4
VOB4
CELL5
VOB5
SET INDICATED AREA TO
TEMPORARY ERASED STATE
VOB1
VOB2
VOB3
VOB4
VOB5
VOB6
VOB7
SET TEMPORARY ERASION FLAG
AT VOB3 & VOB4
CELL1
CELL2
CELL3
CELL4
CELL5
CELL6
CELL7
IN CASE OF 1CELL=1VOB

FIG. 49

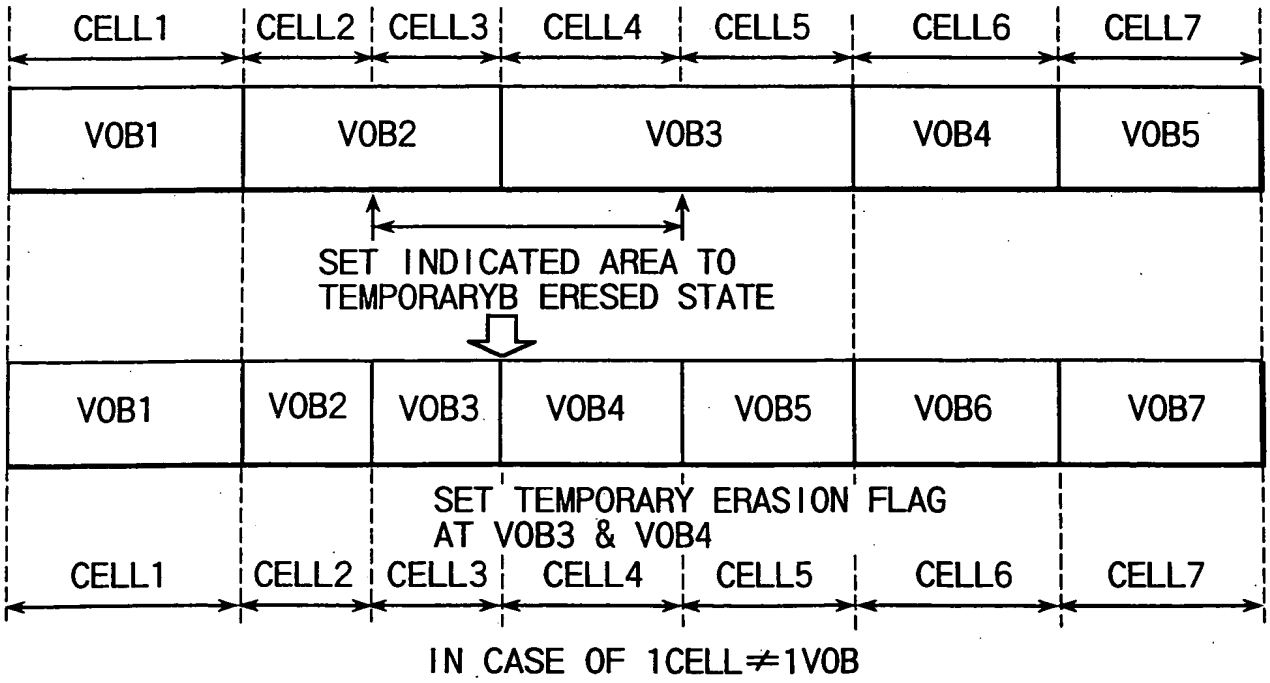
CELL1
CELL2
CELL3
CELL4
CELL5
CELL6
CELL7
VOB1
VOB2
VOB3
VOB4
VOB5
SET INDICATED AREA TO
TEMPORARYB ERESED STATE
VOB1
VOB2
VOB3
VOB4
VOB5
VOB6
VOB7
SET TEMPORARY ERASION FLAG
AT VOB3 & VOB4
CELL1
CELL2
CELL3
CELL4
CELL5
CELL6
CELL7
IN CASE OF 1CELL≠1VOB

FIG. 50